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MICHAEL RODAK, JR.

IN THE

Supreme Court of the United States

OCTOBER TERM, 1973

APPALACHIAN POWER COMPANY,
INDIANA & MICHIGAN ELECTRIC CO.,
KENTUCKY POWER COMPANY,
OHIO POWER COMPANY,
Petitioners,

v.

ENVIRONMENTAL PROTECTION AGENCY,
Respondent.

PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA CIRCUIT

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ENVIRONMENTAL PROTECTION AGENCY,
Respondent.

PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA CIRCUIT

Petitioners pray that a writ of certiorari issue to review the judgment of the Court of Appeals for the District of Columbia entered in this case.

OPINION BELOW

The opinion of the Court of Appeals is unofficially reported at 5 E.R.C. 1820 and is reprinted in the Appendix to this Petition at App. 1a-26a.[1]

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[1] The opinion below consolidated the decision sought to be reviewed here with that in Essex Chemical Corp., *et al.* v. Ruckelshaus, No. 72-1072. The *Essex* case involved review of standards for new sulfuric acid plants.

JURISDICTION

The judgment of the Court of Appeals was rendered on September 10, 1973. Petitioners' timely motion for rehearing and suggestion for rehearing *en banc* was denied on October 3, 1973, by an order which appears at App. 27a. The jurisdiction of this Court is invoked pursuant to 28 U.S.C. § 1254(1).

QUESTIONS PRESENTED

The ability of electric power generating companies to meet the growing demands for electricity for commercial, industrial and private use in the next few decades will almost certainly depend upon the degree to which those companies will be able to utilize the nation's abundant supplies of coal. Increasingly acute shortages of oil and natural gas from domestic sources, the uncertainties surrounding the availabiilty of oil and gas from abroad, and growing demands from other segments of the economy for these fossil fuels all make it absolutely necessary for electric companies to make effective and efficient use of the vast deposits of coal lying principally in Northern Appalachia, the Midwest, and the Northern Rocky Mountains. The prospects for the use of much of this coal in the near future in new or modified electric generating plants, however, are severely threatened by regulations promulgated under the Clean Air Act by the Administrator of the Environmental Protection Agency (EPA) on December 31, 1971, establishing air pollution emission standards for coal-fired electric power plants, the construction or modification of which was commenced after August 17, 1971. Convinced that the effect of the standards will be to force electric utilities to expend billions of dollars

for installation of a system of pollution control technology that has not been shown capable of meeting the emission standards, petitioners sought review of the regulations in the Court of Appeals pursuant to Section 307(b)(1) of the Clean Air Act. Despite the failure of the standards to have been achieved by any pollution control system, and EPA's noncompliance with the National Environmental Policy Act (NEPA), the Court of Appeals for the most part upheld the standards. The questions presented are:

1. Whether Section 111 of the Clean Air Act authorizes EPA to promulgate binding emission standards which have never been shown to be achievable or to be based on an adequately demonstrated system.

2. Whether the Court below erroneously held that no NEPA environmental impact statement need be filed by EPA in promulgating standards under Section 111 of the Clean Air Act.

STATUTES AND REGULATIONS INVOLVED

Section 111 of the Clean Air Act of 1970, 42 U.S.C. § 1857c-6, authorizes the EPA Administrator to promulgate "standards of performance" for new stationary air pollution sources, which are defined in Section 111(a)(1) as

> "a standard for emissions of air pollutants which reflects the degree of emission limitation achievable through the application of the best system of emission reduction which (taking into account the cost of achieving such reduction) the Administrator determines has been adequately demonstrated."

Section 102(2)(C) of the National Environmental Policy Act of 1969, 42 U.S.C. § 4332(2)(C), provides in pertinent part:

> "The Congress authorizes and directs that, to the fullest extent possible: . . . (2) all agencies of the Federal Government shall—
>
> (C) include in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official on—
>
> (i) the environmental impact of the proposed action,
>
> * * *
>
> (iii) alternatives to the proposed action,
>
> (iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and
>
> (v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented. * * *"[2]

The regulations involved, "Standards of Performance for New Stationary Sources," were published in 36 Fed. Reg. 24876-24895 (December 23, 1971), 40 C.F.R. §§ 60.1 *et seq.* (1972).

STATEMENT OF THE CASE

The principal means by which the Clean Air Act, as amended by the Clean Air Amendments of 1970,[3]

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[2] The foregoing and other relevant portions of NEPA and the Clean Air Act appear in the Appendix to this Petition at App. 28a-38a.

[3] 42 U.S.C. §§ 1857-1858a. The Clean Air Act will also hereinafter be referred to as "the Act."

provides for the protection of public health and welfare from the harmful effects of air pollution is the promulgation of national ambient air quality standards by EPA under Section 109 of the Act[4] and the adoption under Section 110 of state implementation plans providing for the attainment of these standards within a specified time by the imposition of emission limitations upon various stationary sources of pollutants.[5] A somewhat different means of control is provided in Section 111,[6] which is applicable only to new or modified stationary sources, and which requires that "new major industry plants such as power plants . . . achieve a standard of emission performance based on the latest available control technology, processes, operating methods, and other alternatives."[7] In this manner Congress sought to place all new sources of pollution on an equal footing by assuring that they not be located on the basis of which states had the highest air quality and thus the most lenient emission limitations in their implementation plans.[8] The Act thus provides for a complimentary

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[4] Primary and secondary standards are designed to protect the public health and welfare, respectively. 42 U.S.C. § 1857c-4.

[5] 42 U.S.C. § 1857c-5. Such plans must be adopted by the states and approved by the Administrator. Violations of state implementation plans may give rise both to state and federal enforcement actions. 42 U.S.C. § 1857c-8.

[6] 42 U.S.C. § 1857c-6.

[7] Summary of the Provisions of Conference Agreement on the Clean Air Amendments of 1970, submitted by Senator Muskie, 116 Cong. Rec. 42384 (1970).

[8] Section 111 of the Act was added reflecting Congressional concern that "[t]hose areas which have levels of air quality which are better than the national standards [might] find their quality degraded by the construction of new sources. There should be no 'shopping around' for open sites." Remarks of Senator

system of controls under which all designated stationary sources, both existing and new, must comply with the Section 110 emission limitations promulgated by the states for the achievement of the ambient air quality standards, and new or modified sources must in addition comply with Section 111 emission limitations based upon the best available technology.

Promulgation Of The Standards By EPA. Pursuant to Section 111 of the Clean Air Act, the Administrator on August 17, 1971, published in the Federal Register[9] proposed standards of performance for fossil fuel-fired steam electric generators, and invited interested persons to submit written comments.[10] The preamble to the proposed regulations stated that the standards were based on "stationary source testing" and on data derived from technical literature and "other sources," and that "[s]ummaries of the pertinent data" were available from EPA.[11]

Muskie on introduction of S. 4358 (the Senate version of the Clean Air Amendments of 1970), 116 Cong. Rec. 32902 (1970). *See also* remarks of Senator Randolph, 116 Cong. Rec. 33075 (1970).

[9] 36 Fed. Reg. 15704 *et seq.* The proposed regulations are reprinted in relevant part in the Appendix to the Briefs in the Court of Appeals (hereinafter cited "C.A. Appx.") at 1-20, a copy of which is being filed with the Clerk of this Court together with the Petition.

[10] Such participation is expressly provided for by Section 111 (b)(1)(B) of the Act. Comments on the proposed standards of performance were submitted by petitioners and other interested parties, including utility companies, and local, state and federal agencies. A number of these are included in the Appendix below at C.A. Appx. 69-224.

[11] The data referred to consisted of two documents, containing "Background Information" and "Test Data." These documents are reprinted in relevant part in the Appendix below at C.A. Appx. 21-68.

The final standards, promulgated on December 23, 1971, establish limits for the emission of three pollutants from "new" coal-fired steam generator plants,[12] *i.e.*, those the construction or modification of which was commenced after August 17, 1971. The publication of the standards was accompanied by a terse description of "the principal revisions" resulting from "a review of the proposed regulations and consideration of the comments."[13] At no stage during the rulemaking proceeding did the Administrator prepare an environmental impact statement, or otherwise comply with the provisions of the National Environmental Policy Act.[14]

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[12] Standards of Performance for New Stationary Sources, 36 Fed. Reg. 24876 *et seq.*, 40 C.F.R. §§ 60.40-60.46 (hereinafter also referred to as "the Standards").

The pollutants are particulate matter, sulfur dioxide, and nitrogen oxides. The other sources, not involved here, for which standards were also established on this date are portland cement plants, incinerators, nitric acid plants, and sulfuric acid plants.

[13] 36 Fed. Reg. 24876. (App. 38a-43a). The sole reference to the statutory provisions controlling the promulgation of standards of performance and to the basis for the Administrator's rejection of objections to the standards was contained in a single conclusory paragraph. *Id.* 24876-77 (App. 42a-43a). Subsequently on March 21, 1972, in response to a decision of the D.C. Circuit (Kennecott Copper Corp. v. Environmental Protection Agency, 462 F.2d 846 (D.C. Cir. 1972)), the Administrator published a *post hoc* "Supplemental Statement" of the basis for the standards. 37 Fed. Reg. 5767-71 (App. 43a-61a). In general, the Supplemental Statement simply elaborated on the basis for the standards as set out in the two background documents distributed by EPA when the proposed standards were announced.

[14] 42 U.S.C. §§ 4321 *et seq.*, hereinafter referred to as "NEPA." So far as the record shows, the Administrator did not even make a formal determination as to whether compliance with NEPA was required.

The Basis For The Standards. In its briefs in the Court below,[15] petitioners discussed in detail the basis for and manner in which the Administrator established the standards of performance at issue. Petitioners will not reiterate all of these points here since the basic facts were undisputed below. However, in order to place the legal issues in perspective, petitioners will briefly discuss the background and significance of the decision of the Court of Appeals in connection with the Administrator's promulgation of the controversial sulfur dioxide standards.[16]

The sulfur dioxide emission standard[17] established by EPA is based on the use of a pollution control system known as a limestone injection wet scrubbing process. This process attempts to make use of the fact that sulfur dioxide, which is released in the boiler exhaust gas as the sulfur in coal burns, is chemically active and combines readily with alkaline materials.[18]

EPA's methodology in establishing the standards was to obtain data "from references listed in the literature for those control systems exhibiting the most advanced technology in SO_2 extraction supplemented by a test program conducted by the Office of

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[15] Copies of the briefs of petitioners and the Government below are being filed with the Clerk of this Court with this Petition.

[16] The nitrogen dioxide and particulate standards were also challenged below.

[17] The standard prohibits discharge into the atmosphere of sulfur dioxide in excess of 1.2 lbs. per million Btu heat input averaged over a maximum two-hour period when solid fossil fuel—*e.g.*, coal—is burned. 40 C.F.R. § 60.43(b).

[18] For a more detailed description of the system, *see* Petrs. Br. 41-42.

Air Programs."[19] Four coal-fired facilities in the United States were found to have used the lime-slurry scrubbing system, which EPA concluded was the "only" system "considered adequately demonstrated on large steam generators." Of these four units, the best that could be said of their performance was that "[a] lime-slurry scrubbing system, demonstrated for 6 months on *two* coal fired units of 125 and 140 mw capacity, *approached* the SO_2 emission limit of 1.2 pounds per million Btu."[20] The EPA Test Data show that all four units in fact failed to meet the standards.[21] Further, the units had considerable operating difficulties, never operated continuously for more than several days, and experienced frequent breakdowns due to malfunctions and scaling.[22] The record clearly demonstrated that the specific SO_2 standards were simply never achieved, and the system upon which the sulfur dioxide standards were based is at best

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[19] C.A. Appx. 58.

[20] C.A. Appx. 34-35 (emphasis added). Although EPA characterized these units as "large steam generators," all units installed in new plants will generally be in the 600-800 mw range, and some will be considerably larger. The absence of test data on units of this size further undercuts the Administrator's conclusions.

[21] C.A. Appx. 62. EPA's so-called "test program" attempted a "verification" of reported performance data for the 125 mw units operated by the Kansas Power and Light Company at Lawrence, Kansas. However, the data resulting from the EPA test showed SO_2 emission of about 1.4 lbs. per million Btu, *16 percent in excess* of the amount allowed by the standards. (C.A. Appx. 35, 62).

[22] For example, of the two units which "approached" the standards, the Kansas Power unit switched from coal to gas during malfunctions, and had scaling problems preventing high efficiency (*see* Petrs. Br. 45-47), and Union Electric's plant was abandoned in 1971 after four years' effort and expenditures in excess of $3 million because of frequent shut-downs caused by plugging of the boiler. (*See* Petrs. Br. 48-50).

only experimental, and demonstrated no ability to perform reliably under normal, commercial operating conditions.[23] This was the conclusion of the other federal agencies with expertise in this area.[24] For example, in its comments on the proposed standard, the Federal Power Commission concluded that the background information supplied by EPA, which set forth the test data, was "not sufficiently definitive or conclusive to provide design and operating bases that assure conformity through developed technology with the proposed standards."[25] In the same month that the proposed standards of performance were announced by EPA, the President transmitted to Congress the annual report of the Council on Environmental Quality, which concluded that "[t]echnology to control sulfur oxides and nitrogen oxides emissions is not yet commercially proven."[26] Nothing in the record casts doubt on this conclusion, which undercuts the entire predicate for EPA's decision.

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[23] Since electricity cannot be stored, obviously continuous operation and a high degree of reliability are of paramount importance to electric power companies.

[24] Indeed, EPA itself had doubts about the system relied upon. On June 30, 1971—just two months before the proposed sulfur dioxide new source standards were announced—EPA contracted with Combustion Engineering, Inc., for a research project, the "background and purpose" section of which contract discussed the two scrubbing units on the 125 mw Kansas Power facility and concluded that "*[T]o date, neither unit has demonstrated sufficiently adequate operation to be considered a viable approach to SO_2 control.*" *See* Petrs. Br. 45.

[25] C.A. Appx. 71. Because of the absence of demonstrated control technology, the Federal Power Commission concluded that EPA should have deferred promulgation of final standards. (C.A. Appx. 74).

[26] *The Second Annual Report of the Council on Environmental Quality* 81 (August 1971).

The Decision Of The Court Of Appeals. On January 24, 1972, petitioners, each of which is an electric utility that is or will be adversely affected by the standards,[27] filed a petition for review of the standards in the Court of Appeals pursuant to Section 307(b)(1) of the Act.[28] In their briefs below, petitioners challenged on two principal grounds the lawfulness of the standards of performance. First, petitioners objected to the absence of any basis in the record for the conclusion that the specific emission limitations are "achievable" and are based on systems of emission reduction which, "taking into account the cost of achieving such reduction," are "adequately demonstrated" as required by Section 111(a)(1) of the Act. Second, petitioners objected to the failure of the Administrator to comply with the explicit requirements of NEPA.

The Government did not challenge the basic factual claims made by petitioners. It was undisputed that at no stage of the proceedings had EPA prepared an

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[27] Each petitioner is a part of the American Electric Power system, one of the largest investor-owned electric power systems in the United States. Petitioners rely almost exclusively on coal to fuel their existing generating units, and since coal is the only fuel readily available in commercial quantities in the localities which they serve it is anticipated that coal would be used to fuel new steam generating plants constructed to meet the projected large, increasing demand for electricity. Because the standards of performance cannot be met by currently available pollution control systems for coal-fired plants, these standards will make it extremely difficult, if not in fact impossible, for petitioners to meet the power needs of the areas that they serve.

[28] 42 U.S.C. § 1857h-5(b)(1). On January 21, 1973, petitions also were filed in the Court of Appeals by Essex Chemical Corp., *et al.* (No. 72-1072), and by the Portland Cement Association (No. 72-1073) to review the portland cement and sulfuric acid plant standards respectively.

environmental impact statement or otherwise complied with NEPA. On the issue of the state of development of the systems on which EPA based its decisions, the Government argued simply that—even if the test data did not show the standards to have been achieved—the statute vested broad discretion in the Administrator, and that he was allowed to determine what was "achievable" at some undetermined point in the future based on th agency's "expertise."[29] This presented the Court of Appeals with clear legal issues.

In a somewhat terse, consolidated opinion,[30] which dealt only briefly with the electric power plant standards, the Court of Appeals held that EPA is exempt from filing NEPA impact statements in making Section 111 determinations, relying on the decision of another panel in a companion case, *Portland Cement Association* v. *Ruckelshaus*.[31] In Part IV of its opinion, the Court held simply that with the exception of the opacity standard for particles, it could not "say that the standards represent 'a clear error of judgment.'" citing this Court's opinion in *Citizens to Preserve Overton Park, Inc.* v. *Volpe*, 401 U.S.

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[29] (Gov't Br. 35, 39.) The Government also argued that the record need not contain all the data (*id.* at 31), that EPA could assume that the test data it received from private plant operators did not reflect "normal incentive" to develop efficient equipment (*id.* at 43, 47, 62), that the standards should be "stringent enough" to require new sources to "advance" their technology so that they may "operate within the law," (*id.* at 36-37), and that EPA is not required by the statute to determine whether the costs are reasonable in light of the emission reductions achieved. (*Id.* at 25, 46).

[30] The opinion below also dealt with the standards for sulfuric acid plants, which are not involved in this petition.

[31] 5 E.R.C. 1593 (D.C. Cir., June 29, 1973).

402 (1971) (App. 24a-25a). Although the Court did remand the standards to EPA for further proceedings on certain issues, the Court's opinion was final and upheld EPA on the issues raised here, namely, the basic lawfulness of the standards under Section 111 of the Act, and the failure to prepare a NEPA impact statement.[32]

REASONS FOR GRANTING THE WRIT

The granting of the Petition for Certiorari in this case is supported by not one but several of the grounds that are traditionally deemed sufficient by this Court to justify plenary review. The decision below is at odds with the language and legislative history of NEPA and Section 111 of the Clean Air Act, and the questions presented in this case involve recurring issues of fundamental importance concerning the administration of these two paramount environmental statutes. The decision of the Court of Appeals has departed from the governing principles set forth in this Court's decision in *Overton Park*, *supra*. Review is additionally warranted because this case raises significant questions concerning the electric-generating capacity of this country, the use of various fuels, and the ability of utilities to respond to the energy crisis for years to come.

I. THE DECISION BELOW IS INCONSISTENT WITH CONGRESSIONAL CLEAN AIR ACT POLICY, DIRECTLY CONFLICTS WITH A DECISION OF THE D.C. CIRCUIT, DEPARTS FROM THIS COURT'S DECISION IN OVERTON PARK, AND INVOLVES QUESTIONS OF CONTINUING IMPORTANCE.

The Court's unrealistic, constraining construction of Section 111 of the Clean Air Act is of overwhelming importance to the electric generating industry

[32] *See* pp. 16-17, 24-25, 28-29, *infra*.

and to the public. The unquestioned effect of the Administrator's decision will be to impel the installation of the lime-slurry scrubbing system for control of sulfur dioxide emissions on virtually all new coal-fired steam generating plants,[33] which the Federal Power Commission concluded would require the expenditure of "billions of dollars" for installation of stack gas cleaning devices that "may not be capable of meeting the required standards."[34]

These impacts could not have come at a worse moment for the electric utility industry and the public. The country is facing greatly increasing demands for the use of electricity[35] as well as growing shortages of utility fuels, particularly oil, gas and low sulfur coal. Although high sulfur coal is this nation's most abundant energy source,[36] the instant regulations

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[33] Although it is the industry's general view that demonstrated technology is not available to meet the standards, the effect of the regulations is to impel utilities to install the system upon which EPA based its standards with the hope that EPA might in turn feel obligated to grant such companies variances or decline to bring enforcement action in the event of subsequent failures of the system to achieve the standards. Utilities with a less sanguine prediction of EPA enforcement might decide to cease construction of new coal-fired plants, which would jeopardize the use of the nation's abundant coal reserves, and could well impair their ability to meet power needs of the areas they serve.

[34] C.A. Appx. at 72. EPA's conservative estimate is that sulfur dioxide control will cost $18 million for a typical coal-fired unit of 600 mw capacity. (C.A. Appx. 262).

[35] In a comprehensive survey, the Federal Power Commission has projected that the electric power industry's present plant capacity will have to be doubled in this decade, and almost doubled again in the 1980's. *1 1970 National Power Survey* at I-1-17 (December, 1971).

[36] In 1970, 54 percent of the nation's electric power was generated by coal. (*Id.*, at I-1-19).

promulgated by EPA have cast a cloud over its future use in new generating plants.

The decision is of continuing importance because EPA has an ongoing responsibility, pursuant to Section 111, to update the standards for new coal-fired electric utilities as technology improves, and to promulgate standards for other industries. The statutory question is thus of the greatest importance, and the prompt resolution thereof is vitally necessary so that the uncertainty and apprehension surrounding the construction of new coal-fired plants can be dispelled. The unfortunate decision below not only impliedly attributes to Congress an intent to place industry in an untenable position, but does so unnecessarily.

EPA's Authority Under Section 111 Of The Clean Air Act. In Section 111(a)(1) Congress spelled out the scope of the Administrator's authority for the promulgation of valid standards of performance. The standards must reflect an emission limitation that is "achievable"; they must be based on application of the best system of emission reduction which has been "adequately demonstrated," and which takes "into account the cost of achieving such reduction."

The legislative history of Section 111 indicates Congress' intent that the Administrator base the new source standards on a finding of the demonstrated capability of the particular industry to reach a specified degree of emission control in all new facilities on a continuing, reliable, long-term, and not unduly costly basis. The Senate Committee stated

> "that the [Administrator] should examine the degree of emission control which has been or can be achieved through the application of technology which is available or normally can be made available,"

and noted that new stationary sources subject to standards of performance under the Act are "expected to be in compliance with those standards throughout their operating life."[37] Similarly, the House Report stated that "[i]n order to be considered 'available' the technology may not be one which constitutes a purely theoretical or experimental means of preventing air pollution."[38]

Based on this legislative history, the Court of Appeals in the companion *Portland Cement* case, *supra*, announced the following standard:

> "The Administrator may make a projection based on existing technology, though that projection is subject to the restraints of reasonableness and cannot be based on 'crystal ball' inquiry. As there, the question of availability is partially dependent on 'lead time,' the time in which the technology will have to be available. Since the standards here put into effect will control new plants immediately, as opposed to one or two years in the future, the latitude of projection is correspondingly narrowed. If actual tests are not relied on, but instead a prediction is made, 'its validity as applied to this case rests on the reliability of [the] prediction and the nature of [the] assumptions.'"[39]

The Court below apparently recognized that it faced a most difficult question with respect to the

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[37] S. Rep. No. 91-1196, 91st Cong., 2d Sess. 16, 17 (1970). It seems reasonable to infer from this that it was intended that, for a standard to be "adequately demonstrated," it should be shown to be achievable on a basis consistent with normal operating conditions of the new sources covered.

[38] H. Rep. No. 91-1146, 91st Cong., 2d Sess. 10 (1970).

[39] 5 E.R.C. at 1603-04. This opinion was rendered by another panel of the Court prior to the decision in the present case.

sulfur dioxide standard, in view of the fact that lime scrubbing technology on which it was based was experimental and "the EPA tests give results indicating that a presently installed unit *approaches rather than achieves* the 1.2 lbs./million Btu heat input standard."[40] The Court went on to conclude, however, that

> "when the [test] results are considered in conjunction with the prototype testing data and the predictions and guarantees of domestic equipment manufacturers for plants under construction, we cannot say that the standard represents a 'clear error of judgment.'" (App. 24a-25a).

The only reference to prototype testing data in the record and relied upon by the Administrator and cited by the Court are (1) a single one-sentence reference to a "prototype unit" and (2) brief mention of Combustion Engineering "pilot studies" for which no substantiating data are provided.[41] It is inconceivable that these two exceedingly brief, unsubstantiated references to prototypes or pilot studies could be thought of by the Administrator as justifying his disregard of the operations reported in the literature and in his own test program, and the consistent failure of actual operating plants to achieve the standard. Similarly, the "predictions and guarantees" of three equipment manufacturers[42] cited by the Court

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[40] App. 24a. (emphasis added). The references in the record cited by the Court confirm the conclusion that the best performance reported exceeded the standard.

[41] C.A. Appx. 35, 261. These points are discussed in greater detail in the Petition for Rehearing filed below at 5-9, a copy of which has been filed with the Clerk of this Court.

[42] App. 24a-25a, n.47. The Court refers to the guarantees of Monsanto, Zurn and Babcock & Wilcox.

refer to two systems other than that upon which the standard was based,[43] and one which must be discounted in the light of the company's recommendation "against standards based on the incorrect assumption of commercially proven wet scrubbing systems."[44] Reliance by the Court upon designers' guarantees for systems not yet in operation as a means of proving that the system is "adequately demonstrated" is clearly contrary to Congress' directive. Moreover, the reliance placed upon guarantees is at odds with the holding of the Court in the companion *Portland Cement* case, *supra*.[45]

Neither the statutory language nor the legislative history suggests that Congress intended that the Administrator implement Section 111 in such a way as to require companies at their own risk to incur prohibitive costs for the construction and installation of inadequately tested emission control systems that had

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[43] The Monsanto guarantee relates to a catalytic oxidation system which EPA itself found not adequately demonstrated (C.A. Appx. 35), and the Zurn guarantee is applicable to an oil-fired plant. (C.A. Appx. 261).

[44] Babcock & Wilcox's comments also state that the lime slurry system has a low "scrubbing efficiency" and "would be far short of the emission limits for the higher sulfur fuels commonly burned in large steam generators." (C.A. Appx. at 171-72).

[45] "[i]f vendor representations were to be a principal source of reliance by the agency, representations peculiarly subject to considerations of self-interest, more might be required than mere comments." (5 ERC at 1610, n.95). The Court also misplaced reliance on an EPA statement that the standard can be met by 70-75 percent removal of sulfur dioxide formed by burning regular coal (C.A. Appx. 261), which assumption was disproved by EPA's own test data. (C.A. Appx. 53). *See note 21, supra.*

not been shown to be effective.[46] The absence of anything in the Court's opinion or in the record justifying the conclusion that the technology is commercially available for installation on new plants, in the face of the admitted fact that the standards were never achieved, provides a particularly appropriate basis for plenary review of EPA's statutory responsibilities under Section 111 of the Act.[47]

Further, the absence in the record of support for the Administrator's determination that the standards are achievable compels the conclusion that the Court below could not have subjected that determination to

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[46] In the only known case in which the question of the feasibility of sulfur dioxide scrubbing system has been litigated, the court held after a lengthy trial—at which leading experts, including EPA and state agency representatives, testified—that there was *no system available*, including in particular the wet limestone scrubbing system, that had been shown to be commercially available and adequately demonstrated for reliable control of sulfur dioxide emissions. Commonwealth of Pennsylvania v. Pennsylvania Power Co., 5 E.R.C. 1373, 1379 (Lawrence County Ct. C.P., April 19, 1973).

[47] The statutory question is rendered more acute by EPA's own recent conclusions regarding the *continuing* unavailability of sulfur dioxide control systems. During October 1973 EPA held three weeks of hearings on the status of flue gas desulfurization (FGD) technology for electric power plants. EPA's October 18, 1973 presentation at the hearings concluded that the wet limestone boiler injection process, upon which it based the new source standards, has been abandoned (by the manufacturer and EPA) in favor of a "tail end" scrubbing process, and that even as to newer processes, the best that could be said is:

> "[I]n view of the fact that a number of large scale plants scheduled for operation in the U.S. in the near future will provide additional engineering effort to solve these problems, EPA believes that an additional twelve months operating experience should effectively remove engineering barriers to the application of FGD to many U.S. facilities." EPA (Princiotta) Presentation, § IV (on file at EPA).

a "thorough, in-depth review" by "engag[ing] in a substantial inquiry" and "review[ing] the whole record." *Citizens to Preserve Overton Park, Inc.* v. *Volpe*, 401 U.S. 402, 415, 419 (1971). In that case this Court made clear that although "the court is not empowered to substitute its judgment for that of the agency," the "inquiry into the facts is to be searching and careful," and in every case the court must determine whether "the decision was based on a consideration of relevant factors." *Id.* at 416.

The lower court's approach cannot be squared with this Court's approach in *Overton Park*. The inescapable conclusion is that, despite the obvious importance of this case, the Court below applied an erroneous standard of review and simply failed to take an in-depth look at the problems presented.[45]

The Continuing Controversy Over The Ambient Air Quality Standards. Finally, the problems raised by the standards of performance for new coal-fired steam generators promulgated by EPA under Section 111 are compounded by the fact that the primary and secondary ambient air quality standards—upon which the Section 110 emission limitations applicable to *all* stationary sources are based—remain the subject of intense controversy and vigorous debate. Even though the Section 111 emission standards are based on a

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[45] In *Portland Cement*, *supra*, the Court aptly noted that EPA, "particularly when its decisions can literally mean survival of persons or property, has a continuing duty to take a 'hard look' at the problems involved in its regulatory task." 5 E.R.C. at 1605. In contrast to the Court's formula finding "no clear error of judgment" in the present case, the Court in *Portland Cement* found numerous problems with EPA's methodology in establishing the standards, and remanded the cement regulations in their entirety to EPA.

best technology requirement rather than the achievement of the ambient air quality standards,[49] there is every indication that the unachievable emission levels prescribed for sulfur oxides under Section 111 were established by EPA with an eye more toward the Section 109 ambient air quality standards than the available evidence as to the achievability of those levels through the use of existing technology. It must be more than coincidence that the sulfur oxide emission levels in the standard of performance for new coal-fired steam generators established under Section 111 are identical to the emission levels established under many state implementation plans, which are in turn intended to achieve the EPA ambient air quality standards.

What is particularly unfortunate at this stage is that the initial ambient air quality standards—including those for sulfur oxides—were adopted by EPA in 1971 at a time when the significance of the standards was by no means clear to those industries which would eventually be most directly affected by them. Although the air quality standards were adopted pursuant to informal rulemaking procedures, with an opportunity for submission of written comments, no company or industry had any idea at that time as to what emission levels would eventually be established for particular facilities for the attainment of those standards. The result was that, with one exception, the ambient air quality standards were not challenged in statutory judicial review proceedings.[50]

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[49] *See* pp. 4-6, *supra*.

[50] *See* Kennecott Copper Corp. v. EPA, 462 F.2d 846 (D.C. Cir. 1972), in which the court remanded the standards in question for a further explanation of their basis.

Only with the subsequent promulgation of the Sections 110 and 111 emission levels did the significance of ambient air quality standards and the enormity of the problems created by them become clear. For example, at the root of the emission levels established for discharges of sulfur oxide is the EPA primary ambient air quality standard of 80 μg of SO_2 per cubic meter of air.[51] This standard has been repeatedly questioned by objective observers, most recently in a study which concludes that "more than 13,000 μg of SO_2 per cubic meter of air is needed to produce any measurable broncho constriction,"[52] the most commonly asserted injury to humans from sulfur dioxide. The measurable effects level is thus more than 160 times the level specified in the primary standard.

Such a study, as well as expressed doubts by EPA officials as to the factual basis for the ambient air quality standards,[53] raises the extremely troublesome spectre that billions of dollars may be spent unnecessarily and vast quantities of domestic coal left unused because of the adoption of sulfur dioxide emission levels that are derived, directly or indirectly, from standards that cannot bear scientific scrutiny. Although the present case does not directly involve

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[51] 40 C.F.R. § 50.4(a) (1972). The standard was derived from "Air Quality Criteria for Sulfur Oxides," U.S. Department of Health, Education and Welfare (January 1969).

[52] Baum, Jurgiel, and Gross, "Establishing Environmental Criteria," *Archives of Environmental Health*, Sept. 1973, at 122.

[53] A leading EPA official has been recently quoted as concluding that a technical information base is not adequate to ensure significantly incontrovertible primary ambient air standards and that a major increase in research over the next several years will be needed to acquire such information. Summary of Proceedings, Conference on Health Effects of Air Pollution, National Academy of Sciences, October 3-5, 1973 (G.P.O., November 1973), at 34.

a challenge to the ambient air quality standards, it does provide an opportunity for the Court to make clear to EPA that in promulgating environmental standards and emission levels that will drastically affect major aspects of the economy—and in particular in establishing standards of performance for new coal-fired steam generators—the agency must base its actions upon solid evidence rather than speculation and unfounded prediction.

II. THE DECISION BELOW CONFLICTS WITH CONGRESSIONAL POLICY CONCERNING NEPA AND INVOLVES A QUESTION OF CONTINUING IMPORTANCE TO EPA REGULATORY ACTION

Although the full import of the National Environmental Policy Act has yet to be spelled out in authoritative case law, it is by now clear that the procedural provisions of NEPA "which are designed to see that all federal agencies do in fact exercise the substantive discretion given them . . . establish a strict standard of compliance."[54] Paramount among these procedural provisions is the requirement in Section 102(2)(C) that responsible officials of "*all agencies* of the Federal Government" prepare a "detailed statement" covering the impact of particular actions on the environmental costs which might be avoided, and alternative measures which might alter the cost-benefit equation.[55] Virtually every agency of the federal government has by now prepared an impact statement.

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[54] Calvert Cliffs' Coordinating Committee v. Atomic Energy Commission, 449 F.2d 1109, 1112 (D.C. Cir. 1971).

[55] 42 U.S.C. § 4332(2)(C) (1970) (emphasis added); *Calvert Cliffs'*, *supra*, 449 F.2d at 1114. A related requirement under Section 102(2)(D) is that "all agencies . . . 'study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources'." 42 U.S.C. § 4332(2)(D).

Failure to observe these requirements has been repeatedly held to invalidate the federal proposal or action in question, and to necessitate remand of the matter to the agency for full compliance.[56]

Against this explicit statutory language, the Administrator published proposed standards of performance, promulgated final regulations, and prepared a "Supplemental Statement" of the basis for his regulations without ever making any attempt to prepare an environmental impact statement or to document his consideration of alternative courses of action.

The Court below followed the path of two other recent D.C. Circuit decisions[57] and purportedly left undecided the broad issue of whether EPA must ever comply with NEPA and prepare an environmental impact statement when it undertakes major regulatory action. Instead, it held that since a "proper" construction of Section 111 requires EPA to "take

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[56] *See, e.g.*, Natural Resources Defense Council v. Morton, 458 F.2d 827 (D.C. Cir. 1972); Greene County v. FPC, 455 F.2d 412 (2d Cir. 1972), *cert. denied*, 409 U.S. 849.

[57] In International Harvester Co. v. Ruckelshaus, 478 F.2d 615 (D.C. Cir. 1973), the Court of Appeals remanded to EPA its decision on a one-year suspension of the 1975 automobile emission standards under Section 202 of the Act, and expressly declined to decide the broad NEPA issue based on its determination that the Administrator's suspension decision was "necessarily infused" with environmental considerations, and since its order on remand required a detailed decision by the agency. Subsequently in Portland Cement Association v. Ruckelshaus, 5 E.R.C. 1593 (D.C. Cir., June 29, 1973), the Court remanded the Administrator's decision in promulgating regulations establishing limits on air emissions for new Portland cement plants. As in the *International Harvester* case, the Court expressly refrained from a determination of the broad claim of NEPA exemption raised by the Government, based on its decision that "section 111 of the Clean Air Act, properly construed, requires the functional equivalent of a NEPA impact statement." (5 ERC at 1598).

into account" the adverse environmental effects of a standard, "*no NEPA statement need be filed* by the Administrator in making his Section 111 determinations," on the basis of the companion *Portland Cement* decision. (App. 6a-7a) (emphasis added). However, finding that the sludge byproduct of the lime slurry scrubbing system upon which the standards were based presented significant adverse environmental effects not dealt with by EPA in any manner on the record, the Court below remanded the record to EPA "for further consideration and explanation by the Administrator" of these effects. (*Id.* at 25a). Since, as the following discussion will amplify, this holding does not require even the "equivalent" of compliance with NEPA, the statutory question should be resolved now by this Court.

There Is No Basis For Exempting EPA From NEPA. There surely can be no doubt that the Environmental Protection Agency is an agency of the federal government, encompassed by a statutory directive aimed at "all agencies of the Federal Government," and the fact that the proposed standards of performance qualify as "proposals for . . . major Federal actions significantly affecting the quality of the human environment." For the bases or reasons for this paradox of the leading environmental agency totally ignoring the unambiguous language of this "most important"[58] environmental statute one must examine EPA's position that it is not required to comply in the case of "environmentally protective regulatory activities."[59] The "legislative history" relied upon to support this disregard of the unam-

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[58] *Calvert Cliffs'*, *supra*, 449 F.2d at 1111.

[59] EPA Interim NEPA Regulations § 6.13(b)(6), 38 Fed. Reg. 1696, 1697 (January 17, 1973).

biguous language of the Act derives from a document submitted by Senator Jackson to accompany the Conference Report on NEPA and introduced into the Congressional Record just prior to the Senate's adoption of NEPA, and from an ensuing colloquy between Senators Jackson and Muskie, in which these Senators agreed, as Senator Muskie put it, "[t]hat the legislative mandates" of "agencies having authority in the environmental improvement field" are not changed by NEPA.[60]

This brief so-called legislative history does not on its face support the exemption claimed by EPA, and is at best ambiguous.[61] The reference to the "mandates" of environmental agencies indicates that the concern was with the effect of NEPA on the *substantive* mandate of these agencies, and not with the applicability of NEPA's *procedural* requirements such as the preparation of an environmental impact statement.[62] But regardless of its import, there is

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[60] 115 Cong. Rec. 40417, 40418, 40423 (1969). *See* Portland Cement Ass'n v. Ruckelshaus, *supra*, 5 ERC at 1596.

[61] The ambiguity of this legislative history was acknowledged by the Administrator himself during the NEPA Oversight Hearings, when he stated that "the ambiguity of that colloquy on the floor of the Senate . . . is a shaky basis for an exemption." *Joint Hearings before the Senate Committees on Public Works and Interior and Insular Affairs on the National Environmental Policy Act*, 92d Cong., 2d Sess. at 564 (1972).

[62] The correctness of the foregoing interpretation was confirmed by Senator Jackson, the author of the document relied upon, during the debates on the Federal Water Pollution Control Act Amendments of 1972. "Section 102(2)(C) established procedural requirements that apply to the decisionmaking process for all major Federal decisions that could have an adverse environmental impact. It is not a substantive standard and I, therefore, agreed that the adoption of EPA would not change the substantive mandate for programs administered by EPA." 118 Cong. Rec. S16886 (daily ed., October 4, 1972).

nothing to indicate that the Jackson-Muskie exchange represented the views of the Congress. It does not appear in any Committee or Conference Report on NEPA.[63] Since the Act itself is unambiguous, resort to this legislative history to contradict the plain meaning of the statute is unjustified.[64] Finally, "environmental" agencies other than EPA have acquiesced in the preparation of environmental impact statements.[65]

It is of particular interest that the Council on Environmental Quality, which initially concluded that EPA should not have to prepare impact statements for "environmental protective regulatory activities,"[66] has changed its mind and has revoked this non-statutory exemption in the recent revision of its NEPA Guidelines.[67] And in adopting the Federal Water Pollution Control Act Amendments of 1972, Congress expressly provided EPA with a nar-

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[63] Indeed, Senator Allott, a Conferee, specifically noted at conclusion of the Muskie-Jackson exchange that the document had *not* been reviewed, agreed on and signed by the other Senate Conferees. He emphasized that the Senate would vote on the language "of the Conference Report alone" and not on the interpretations set out by Senators Jackson and Muskie. (115 Cong. Rec. 40422). *See Portland Cement, supra*, 5 ERC at 1596-97.

[64] As the Court stated in United States v. Oregon, 366 U.S. 643, 648 (1961), "such statements, even when they stand alone, have never been regarded as sufficiently compelling to justify deviation from the plain language of a statute."

[65] *See* Anderson, F., *NEPA in the Courts* 107 (1973).

[66] 36 Fed. Reg. 7725 (April 23, 1971).

[67] 40 C.F.R. § 1500.4, 38 Fed. Reg. 20550 (August 1, 1973); for an explanation of the revocation, *see* 38 Fed. Reg. 10856, 10865 (May 2, 1973). *See also* Portland Cement v. Ruckelshaus, *supra*, 5 ERC at 1597, n.31.

row exemption from NEPA,[68] but at the same time assured consideration by EPA of *all* environmental effects in the promulgation of pollution controls by expressly adding the requirement that "non-water quality environmental impact (including energy requirements)" be taken into account.[69] The reasonable conclusion from this is that NEPA must be deemed to be fully applicable to EPA in the absence of an express statutory exemption.

The Issue Of EPA's Exemption From NEPA Should Be Resolved Now By This Court. If the decision below is not reviewed at this time, "EPA would be the only agency of the federal government which could ignore the adverse environmental effects of its actions."[70] The decision below cannot be read as a narrow, confined exception from NEPA which provides a substitute procedure for compliance. The Court of Appeals has now found a so-called "exception" for EPA in all four cases it has decided raising the NEPA issue.[71]

Although the Court remanded the case to EPA for an "explanation" of the adverse environmental ef-

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[68] Section 511(c)(1) of the Act, 33 U.S.C.A. § 1371(c)(1), provides that except for financial assistance and permits for new sources, "no action of the Administrator taken pursuant to this Act shall be deemed a major Federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act of 1969. . . ."

[69] 33 U.S.C.A. § 1314(b)(1)(B) and (b)(2)(B).

[70] *NEPA In The Courts, supra*, at 118.

[71] In addition to the present case and the *International Harvester* and *Portland Cement* cases (*see* n.57 *supra*), the Court recently ruled that EPA was exempt from NEPA in administering the FIFRA pesticide programs, Environmental Defense Fund *et al.* v. E.P.A. (D.C. Cir. No. 72-1548 *et al.*, December 13, 1973).

fects of the regulations, clearly such a *post hoc* procedure is no substitute for compliance with NEPA. This is because the primary purpose of NEPA is to require all federal agencies to consider all of the environmental consequences of their actions "just as they consider other matters within their mandates."[72] A supplementary explanation—such as was ordered by the Court below—has nothing to do with the integral consideration of consequences and alternatives *in the decision making process* which NEPA requires.[73] Decisions affecting the environment must be reached with "individualized consideration and balancing of environmental factors—conducted fully and in good faith."[74] The preparation of an impact statement, and its requisite consideration of alternatives, might well have led the Administrator to reach somewhat different conclusions in promulgating standards of performance.[75] Virtually every sentence of NEPA calls for a thoughtful consideration and balancing by

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[72] *Calvert Cliffs'*, *supra*, 449 F.2d at 1112. For example, the Atomic Energy Commission previously considered the radiological health and safety effects of nuclear power plants; it must now consider all other effects as well, such as the effect of thermal discharges on receiving waters.

[73] *See Portland Cement*, *supra*, 5 ERC at 1598, n.40.

[74] *Calvert Cliffs'*, *supra*, 449 F.2d at 1115. Section 102(2)(C) states that the environmental impact statement must "accompany the proposal through the existing agency review process."

[75] If a particular system of emission reduction would possibly reduce sulfur dioxide emissions, for example, but at the same time create a solid waste disposal problem, or a water pollution problem, then a question might be raised as to whether such system was the "best system" available. Or if a system of emission limitation for nitrogen oxides increases emissions of other pollutants, or requires increases in overall boiler capacity, then other systems should have been explored. Those adverse effects did exist here. *See* Petrs. Br. at 46, 60, 78-80.

EPA of all of the environmental factors relative to the generation of electricity to meet future demands before any long-term decision regarding only one of them is made.

Circulation of an impact statement, as opposed to a supplementary explanation, would also reveal EPA's preliminary views in much greater detail to a wider audience than the resulting limited remand by the Court below.[76] Section 102(2)(C) of NEPA expressly provides that copies of the environmental impact statement shall be made available to the federal and state agencies and the public.[77] This reflects a major objective of NEPA to allow "those removed from the initial process to evaluate and balance the factors on their own."[78] The standards of performance for new stationary sources will have a profound impact upon the electric-generating capacity of this country for years to come. Fundamental questions involving the use of vast reserves of natural resources, selection of sites for generating plants, relative use of various fuels, and the ability of utilities to respond to the energy crisis will necessarily be affected by the standards of performance. A signifi-

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[76] Further, the requirements of the Court of Appeals do not assure that the specific areas enumerated in Section 102(2)(C) will be discussed in detail, and that a fair, systematic procedure for review will be followed every time EPA acts on a major proposal.

[77] The CEQ Guidelines further provide that agencies have a responsibility to develop procedures "to encourage public participation in the impact statement process at the earliest possible time." CEQ Guidelines, *supra*, 40 C.F.R. § 1500.9(d), 38 Fed. Reg 20555.

[78] *Calvert Cliffs'*, *supra*, 449 F.2d at 1114.

cant statutory purpose would be served by making those facts clear, to the Congress,[79] other federal agencies,[80] and the public, and by describing in detail the environmental impact of such possible results.

Finally, the view that EPA in its self-described role of environmental policeman should be exempt, as Senator Jackson persuasively observed, raises the vital question "Who shall police the police?"[81] Clearly Congress contemplated that decisions affecting the environment would be "policed" by subjecting them to the scrutiny of the Congress, other agencies, the states, and the public. This function of NEPA should not be thwarted, as the result below does, by allowing EPA to conduct its activities behind closed doors.

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[79] In *Portland Cement, supra*, the Court concluded that "Congress receives no required information about the possible adverse environmental impact of proposed standards for new stationary sources." 5 E.R.C. at 1598, n.40.

[80] In December 1971, the Federal Power Commission released its comprehensive *1970 National Power Survey* (n.35, *supra*), which included numerous comments on environmental considerations relating to the generation and use of electricity, Part I at I-3-5, I-11-15, I-21-16, I-1-5, 6. Clearly the Administrator would have benefited from an FPC review of an EPA impact statement accompanying the proposed standards of performance.

[81] "[T]he real point to be made is why environmental control programs should be exempt from the constraints of environmental laws? Do we exempt civil rights programs from anti-discrimination requirements? Are labor programs exempted from minimum wage and child labor laws? Are law enforcement officers free to disobey criminal laws? In short, the question is 'Who shall police the police?' EPA should certainly be required to undertake the same open, balancing decisionmaking which NEPA has required of other agencies." 118 Cong. Rec. S16887 (daily ed., October 4, 1972).

CONCLUSION

For the reasons stated, the Petition for Certiorari should be granted.

Respectfully submitted,

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January 1974

APPENDIX

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APPENDIX

UNITED STATES COURT OF APPEALS
FOR THE DISTRICT COURT OF COLUMBIA CIRCUIT

No. 72-1072

ESSEX CHEMICAL CORPORATION, ET AL,
Petitioners,

v.

WILLIAM D. RUCKELSHAUS,
Administrator, Environmental Protection Agency,
Respondent.

No. 72-1079

APPALACHIAN POWER COMPANY
INDIANA AND MICHIGAN ELECTRIC COMPANY
KENTUCKY POWER COMPANY
OHIO POWER COMPANY,
Petitioners,

v.

ENVIRONMENTAL PROTECTION AGENCY,
Respondent.

Petitions for Review of an Order of the
Environmental Protection Agency

Decided September 10, 1973

Robert C. Barnard, with whom *Donald L. Morgan* and *Edward Maguire* were on the brief, for petitioners in No. 72-1072. *Kenneth L. Rachman, Jr.* and *Douglas E. Kliever* also entered an appearance for petitioners in No. 72-1072.

H. Edward Dunkelberger, Jr., with whom *Theodore L. Garrett* was on the brief, for petitioners in No. 72-1079.

James R. Walpole, Attorney, Department of Justice, with whom *Kent Frizzell,* Assistant Attorney General, *Edmund*

B. Clark and *Martin Green*, Attorneys, Department of Justice, were on the brief for respondent in No. 72-1072.

Thomas C. Lee, Attorney, Department of Justice, of the bar of the Supreme Court of Michigan, *pro hac vice*, by special leave of court, with whom *Kent Frizzell*, Assistant Attorney General, *Edmund B. Clark* and *Martin Green*, Attorneys, Department of Justice, were on the brief, for respondent in No. 72-1079.

Turner T. Smith, Jr., filed a brief on behalf of Long Island Lighting Company and National Asphalt Pavement Association, as *amici curiae* urging reversal.

Before: WRIGHT and TAMM, *Circuit Judges*, and DAVIES,* *Senior United States District Judge* for the District of North Dakota.

Opinion for the Court filed by *Circuit Judge* TAMM.

TAMM, *Circuit Judge:* These two appeals, consolidated for purposes of argument and decision, are taken from the action of the Administrator of the Environmental Protection Agency [EPA] in setting "standards of performance" for new or modified stationary sources of pollution pursuant to the mandate of § 111 of the Clean Air Act, as amended [Act], 42 U.S.C. § 1857 c-6 (1970). Among the stationary sources for which standards were set are sulfuric acid plants, subject to challenge in No. 72-1072, and coal-fired steam generators, subject to challenge in No. 72-1079. *See* 40 C.F.R. §§ 60.1 *et seq.* Even when limited to the scope of review prescribed by the Supreme Court in *Citizens to Preserve Overton Park* v. *Volpe*, 401 U.S. 402 (1971), we find that the Administrator's action as to certain aspects of the standards must be remanded for further proceedings; as to the bulk of the standards, however, we find that the Administrator has acted properly within the scope of his authority and not in abuse of his discretion.

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* Sitting by designation pursuant to 28 U.S.C. § 294(d).

I.

On March 31, 1971, pursuant to the requirement of § 111 of the Act, 42 U.S.C. § 1857 c-6 (1970),[1] the EPA published a list of categories of stationary air pollution sources which significantly contribute to the endangerment of public health and welfare. The list included steam generators, incinerators, sulfuric acid plants, nitric acid plants, and portland cement plants. 36 Fed. Reg. 5931 (March 31, 1971). Thereafter, on August 17, 1971, proposed regulations were published establishing federal standards of performance for each new source category on the list. 36 Fed. Reg. 15704 (August 17, 1971). Issued concurrent with the proposed regulations were documents entitled "Background Information for Proposed New-Source Performance Standards" and "Summaries of Test Data," which set forth the justification for the new proposed standards. In December of 1971, after receiving and evaluating more than 200 comments from interested parties,[2] the EPA published final regulations, 40 C.F.R. part 60, incorporating only minor changes from the proposed regulations. 36 Fed. Reg. 24876 (December 23, 1971).

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[1] 42 U.S.C. § 1857c-6(b) (1970) provides in pertinent part:

(1)(A) The Administrator shall, within 90 days after December 31, 1970, publish (and from time to time thereafter shall revise) a list of categories of stationary sources. He shall include a category of sources in such list if he determines it may contribute significantly to air pollution which causes or contributes to the endangerment of public health or welfare.

(B) Within 120 days after the inclusion of a category of stationary sources in a list under subparagraph (A), the Administrator shall propose regulations, establishing Federal standards of performance for new sources within such category. . . . [H]e shall promulgate, within 90 days after such publication, such standards with such modifications as he deems appropriate.

[2] *See* 36 Fed. Reg. 24876 (December 23, 1971).

On January 21 and 24, 1972, Essex Chemical Corp., et al. (No. 72-1072), Portland Cement Association (No. 72-1073), and Appalachian Power Co., et al. (No. 72-1079), petitioned for review in this court pursuant to § 307(b)(1) of the Act, 42 U.S.C. § 1857h-5(b)(1) (1970),[3] challenging the standards set by the EPA for sulfuric acid plants, portland cement plants, and coal-fired steam generators, respectively. Shortly thereafter this court issued its decision in *Kennecott Copper Corp.* v. *EPA*, 462 F.2d 846 (D.C. Cir. 1972), concerning a national secondary ambient air quality standard promulgated by the EPA pursuant to § 109(b) of the Act, 42 U.S.C. § 1857c-4(b) (1970), wherein a remand was ordered so that the EPA might "supply an implementing statement that will enlighten the court as to the basis on which [the Administrator] reached the . . . standard. . . ." *Id.* at 850. In light of the *Kennecott Copper* decision the EPA subsequently published a "Supplemental Statement in Connection with Final Promulgation," 37 Fed. Reg. 5767 (March 21, 1972), in order to avoid the problems presented in *Kennecott Copper* and thus "ensur[e] the rapid conclusion of judicial review of the validity of the [stationary source] standards." *Id.*[4]

II.

On June 29, 1973, another panel of this court issued an opinion remanding the record to the EPA for further proceedings regarding the standards of performance for

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[3] 42 U.S.C. § 1857h-5(b)(1) (1970) provides in pertinent part:

> A petition for review of action of the Administrator in promulgating . . . any standard of performance under section 1857c-6 of this title . . . may be filed only in the United States Court of Appeals for the District of Columbia.

[4] In issuing the "Supplemental Statement" the EPA thus hoped to avoid a remand similar to that required in Kennecott Copper Corp. v. EPA, 462 F.2d 846 (D.C. Cir. 1972), by providing additional information regarding the bases for the standards prior to argument and decision in this court.

portland cement plants, *Portland Cement Association* v. *Ruckelshaus*, No. 72-1073 (D.C. Cir. June 29, 1973). While the records in the two cases *sub judice* are substantially different from that in *Portland Cement* and consequently engender differing conclusions as to the legality of the standards, several issues are so similar and so conclusively dealt with by the *Portland Cement* decision that they can be treated summarily by this court in its determinations today.

1. *NEPA Impact Statement*

One issue raised and extensively briefed in both No. 72-1072 and No. 72-1079 is the consequence of the Administrator's failure to file an "impact statement" pursuant to § 102(2)(c) of the National Environmental Policy Act of 1969 [NEPA], 42 U.S.C. § 4332(2)(c) (1970).[5] Petitioners here allege (as was alleged in *Portland Cement*) that the EPA, merely because it is an environmentally oriented agency, is not exempt from the NEPA provision that in "major Federal actions significantly affecting the quality of the human environment," *all* Federal agencies are subject to the requirement that the responsible official file "a detailed statement . . . on . . . the environmental impact of the proposed action." Petitioners pointedly note that an impact statement, if filed, would have required the EPA to consider factors such as alternative adverse environmental effects and cost/benefit analyses to a consider-

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[5] 42 U.S.C. § 4332(2)(c) (1970):

> [A]ll agencies of the Federal Government shall—
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> (C) include in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official on—
>
> (i) the environmental impact of the proposed action . . . .

This issue was also extensively briefed by amicus curiae Long Island Lighting Co. in No. 72-1079, and amici curiae Long Island Lighting Co. and National Asphalt Paving Co. in No. 72-1072.

ably more significant degree than that which the record shows actually occurred.

The *Portland Cement* panel, per Judge Leventhal, extensively analyzed the considerations pertaining to a general, limited, or non-existent exemption for the EPA from the NEPA impact statement requirements. *See Portland Cement, supra*, slip op. at 5-21. The panel concluded, leaving for another time the consideration of whether the EPA was *completely* exempt from the rigors of an impact statement,[6] that the EPA was exempt at least in its action in promulgating the § 111 standards. The determination was founded upon a "proper" construction of the § 111 mandate that the "standard of performance" reflect "the best system of emission reduction" and require the Administrator to take into account "the cost of achieving such reduction." As "[t]hese criteria require the Administrator to take into account counter-productive environmental effects of a proposed standard,[7] as well as economic

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[6] We likewise refrain from any broader determination of an EPA exemption from the NEPA impact statement requirement.

[7] The EPA argues that §§ 312(a) and 313 of the Clean Air Act, 42 U.S.C. § 1857j-1, 2 (1970), calling for the preparation annually of "economic cost studies for Congress" and a report concerning the "progress and problems of the air pollution control programs under the Act," is an adequate alternative to considering in each case the "counter-productive environmental effects of a proposed standard." *See* Brief for Respondent in No. 72-1072, at 29-31, and Brief for Respondent in No. 72-1079, at 27-28. Such a general year end study simply is not an adequate substitute for a case by case analysis of adverse environmental effects, even to the extent that the case by case analysis is limited by time constraints imposed by Congress. We note that if our interpretation of "best system" did not include a requirement that such factors be considered on such a basis then § 111 of the Clean Air Act, as construed, would in all likelihood not require the "functional equivalent of a NEPA impact statement," and the workable balance would no longer exist. *See* Portland Cement Assoc. v. Ruckelshaus, No. 72-1073 (D.C. Cir. June 29, 1973), slip op. at 15 n. 40. *Compare* Getty Oil Co. v. Ruckelshaus, 467 F.2d 349, 359 (3d Cir. 1972), *cert. denied*, 409 U.S. 1125 (1973).

costs to the industry," the decision that an impact statement is not required in this specific instance strikes a "workable balance between some of the advantages and disadvantages of full application of NEPA." *Id.* at 18-19. The court stated:

> What is decisive, ultimately, is the reality that, section 111 of the Clean Air Act, properly construed, requires the functional equivalent of a NEPA impact statement.

Id. at 16. Finding no good reason to divert from or expand upon the logic of the *Portland Cement* decision, we adhere to the position that no NEPA impact statement need be filed by the Administrator in making his § 111 determinations.[8]

2. *Opacity Standard*

The standards promulgated by the Administrator restrict "acid mist" discharge to no greater than "10 percent opacity" in sulfuric acid plants and "particulate matter" discharge to no greater than "20 percent opacity" in coal-fired steam generators.[9] *See* 40 C.F.R. §§ 60.83(b), 60.42(b). Opacity is defined as the "degree to which emissions reduce the transmission of light and obscure the

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[8] *See espccially* Portland Cement Assoc. v. Ruckelshaus, No. 72-1073 (D.C. Cir. June 29, 1973), slip op. at 17 n. 41, for a discussion of the actions of other courts regarding the impact statement requirement for the EPA, generally relating to the § 110 determination of state plan compliance with the Clean Air Act. *See also* Buckeye Power, Inc. v. EPA, Nos. 72-1628, -29, -32 (6th Cir. June 28, 1973), issued one day prior to the *Portland Cement* decision, a § 110 decision holding an impact statement unnecessary because to do otherwise "would mean that an agency whose sole purpose is the improvement of the environment, would have to file an Environmental Impact Statement with itself." *Id.*, slip op. at 19.

[9] "Acid mist" is defined as "sulfuric acid mist, as measured by test methods set forth in this part," 40 C.F.R. §60.81(b), while "particulate matter" is defined as "any finely divided liquid or solid material, other than uncombined water, as measured by

view of an object in the background." 40 C.F.R. § 60.2(j). A 10 percent opacity standard was established for the portland cement stationary sources of pollution and the *Portland Cement* court, impressed both by the arbitrariness of the test—it is essentially a subjective test on the part of trained inspectors who attempt to judge the per cent of opacity present in a smoke plume—and the persuasive challenges on the part of the petitioners,[10] found that further consideration and explanation of the efficiency and objectivity of the test was necessary prior to its adoption as a standard:

> [I]t is one thing to use a method of testing to observe possible violations of a standard; it is another to constitute that method as the standard itself. If the opacity test is to be a standard, and if violations can result in enforcement actions without further testing, the standard must be consistent with the statute and congressional intent.

Portland Cement, supra, slip op. at 50. Similar opacity standards are challenged in both suits before us today and the principles requiring further consideration are unchanged. The record must be remanded for additional consideration and explanation by the Administrator regarding the reasonableness of the opacity standards.[11]

Method 5." 40 C.F.R. §60.41(e). In the instance of both acid mist and particulate matter alternative methods of measurement other than the opacity test are promulgated. *See* 40 C.F.R. §§ 60.42(a), 60.83(a), which set quantitative limits based upon emissions actually detected by appropriately objective test methods.

[10] *See especially* the discussion in Portland Cement Assoc. v. Ruckelshaus, No. 72-1073 (D.C. Cir. June 29, 1973), slip op. at 51, pertaining to a test conducted for the National Center for Air Pollution Control (U.S. Dept. H.E.W.).

[11] Since the record was remanded in *Portland Cement* for a similar reconsideration of the opacity standard, and since the challenges basically are directed at the test itself rather than particular standards set thereunder, we do not believe that the reconsideration will require much more effort on the part of the EPA than is already required by *Portland Cement*.

3. *Startup, Shutdown, Equipment Malfunction*

Petitioners in both No. 72-1072 and No. 72-1079 raise objections in varying degrees regarding the EPA's failure to provide that lesser standards, or no standards at all, should apply when the stationary source is experiencing startup, shutdown, or mechanical malfunctions through no fault of the manufacturer.[12] Petitioners allege that nowhere in the record has there been a showing that the standards can be equalled during periods of less than normal operation, when plant efficiency and consequently pollution emissions vary significantly from the norm. On August 18, 1972, EPA Acting Administrator Fri admitted that "[a]t the time of promulgation, it was known that even in the case of sources which ordinarily complied with the standards and which followed proper operating and maintenance procedures, there could on occasion occur malfunctions or other events (process startups and shutdowns) during which emissions might temporarily exceed the standards."[13] 37 Fed. Reg. 17214 (August 25, 1972). Concurrent with that statement regulations were proposed

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[12] *See, e.g.*, in No. 72-1072, the Comments of Stauffer Chemical Co., J.A. at 76, 81; Manufacturing Chemists Assoc., J.A. at 121, 137; American Cyanamid Co., J.A. at 267, 268; and in No. 72-1079, the Comments of Edison Electric Institute, J.A. at 123, 126; Michigan Electric Assoc., J.A. at 140, 144-45; Consolidated Edison Co. of New York, J.A. at 188, 197. The comments in No. 72-1079 were substantially directed to the time within which initial performance tests were to be conducted. 40 C.F.R. § 60.8 now provides that the tests must be taken "[w]ithin 60 days after achieving the maximum production rate at which the affected facility will be operated, but not later than 180 days after initial startup of such facility . . . ."

[13] The Acting Administrator specifically stated that "[a]s promulgated, the standards contained no explicit provision to deal with such occurrences," but that "[s]uch occurrences generally are dealt with by the exercise of discretion in the Agency's enforcement activities." 37 Fed. Reg. 17214 (August 25, 1972). *See generally* Portland Cement Assoc. v. Ruckelshaus, No. 72-1073 (D.C. Cir. June 29, 1973), slip op. at 44-47.

providing a framework within which unavoidable excesses of the standard would normally not be considered violations of the regulatory guidelines (so long as certain reporting requirements are fulfilled). The identical issue was raised in *Portland Cement* and the court there found the challenge persuasive enough to merit a remand. The significance of the proposed regulation was fully recognized:

> If the EPA adopts, or intends to adopt, this proposed regulation, it may take the attendant flexibility into account, on remand, as pertinent to the manufacturers' objections, even though the new regulation has been proposed in a proceeding with a different docket number and caption.

Portland Cement, supra, slip op. at 47. We agree that such variant provisions appear necessary to preserve the reasonableness of the standards as a whole and that the record does not support the "never to be exceeded" standard currently in force. Thus, we remand for further consideration of this issue, noting that the proposed regulation should play an integral role in any reconsideration.

III.

The focal point of our analysis of the EPA's standard setting must be the statutory statement defining "standard of performance." Section 111 of the Act, 42 U.S.C. § 1857 c-6(a)(1) (1970), states:

> The term "standard of performance" means a standard for emissions of air pollutants which reflects the degree of emission limitation achievable through the application of the best system of emission reductio which (taking into account the cost of achieving such reduction) the Administrator determines has been adequately demonstrated.

It is the system which must be adequately demonstrated and the standard which must be achievable. This does not

require that a sulfuric acid plant be currently in operation which can at all times and under all circumstances meet the standards; nor, however, does it allow the EPA to set the standards solely on the basis of its subjective understanding of the problem or "crystal ball inquiry." *See Portland Cement, supra*, slip op. at 29-31. An adequately demonstrated system is one which has been shown to be reasonably reliable, reasonably efficient, and which can reasonably be expected to serve the interests of pollution control without becoming exorbitantly costly in an economic or environmental way. An achievable standard is one which is within the realm of the adequately demonstrated system's efficiency and which, while not at a level that is purely theoretical or experimental, need not necessarily be routinely achieved within the industry prior to its adoption.[14]

In subjecting the Administrator's actions to judicial review we apply a test of reasonableness, wherein we are "not empowered to substitute [our] judgment for that of the agency" but must consider whether "the decision was based on a consideration of the relevant factors and whether there has been a clear error of judgment." *Citizens to Preserve Overton Park* v. *Volpe, supra*, 401 U.S. at 416. The judgment of the Administrator is to be weighed against his statutory function and limitations, the record searched to determine if indeed his decisions and reasons therefore are themselves reasoned, and at that point our function terminates. Our "expertise" is not in setting

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[14] The legislative history of § 111 of the Clean Air Act, as amended, 49 U.S.C. § 1857c-6 (1970), reveals that Congress was most concerned that new plants—new sources of pollution—would have to be controlled to the greatest degree practicable if the national goal of a cleaner environment was to be achieved. *See S. Rep.* No. 1196, 91st Cong., 2d Sess. 16 (1970); Summary of the Provisions of Conference Agreement on the Clean Air Act Amendments of 1970, 116 CONG. REC. 42384, 42385 (1970). The Conference Committee considered S. 4358, 91st Cong., 2d Sess. § 113 (1970) and H.R. 17255, 91st Cong., 2d Sess. § 112 (1970).

standards for emission control but in determining if the standards as set are the result of reasoned decision-making. Yet, even this limited function requires that we foray into the technical world to the extent necessary to ascertain if the Administrator's decision is reasoned. While we must bow to the acknowledged expertise of the Administrator in matters technical we should not automatically succumb thereto, overwhelmed as it were by the utter "scientificity" of the expedition.

A vast majority (97 per cent) of sulfuric acid plants in the United States produce sulfuric acid by means of a "contact" process, involving these three steps:

> (1) Elemental sulfur or other sulfur-bearing raw material is burned to obtain sulfur dioxide gas [SO(2)];
>
> (2) Sulfur dioxide gas is converted into sulfur trioxide [SO(3)], upon *contact* with a catalyst, generally vanadium pentoxide;
>
> (3) Sulfur trioxide gas is then absorbed in sulfuric acid [H(2)SO(4)], through combination with the water in a 98 to 99 percent sulfuric acid solution with which it is circulated in an absorption tower.

Any unconverted sulfur dioxide gas passes through demister equipment (to eliminate acid mist, basically sulfuric acid mist formed by the combination of sulfur trioxide and water vapor), and escapes out the stack into the atmosphere. The regulations permit sulfur dioxide emissions up to a level of 4.0 lbs. per ton of sulfuric acid produced, and acid mist emissions up to 0.15 lb. per ton of sulfuric acid produced, as measured by methods approved in the regulations. *See* 40 C.F.R. §§ 60.82, 60.83. Generally those plants burning an elemental sulfur feedstock—about 68 per cent of all sulfuric acid plants in the United States are subject to greater quality control, higher efficiency, and consequently experience less emission problems than those burning

only sulfur-bearing raw materials.[15] The latter, known variously as "recycle," "spent acid," and "wet gas" plants, serve an important environmental function, however, for among the raw materials used for feedstocks are wastes from petroleum refineries and other chemical processes.[16]

There are two types of sulfuric acid plants in general use today, "single" and "dual" absorption. The term "single" and "dual" refer to whether the plant uses one or two stages in steps #2 and #3 of the contact process. Dual absorption plants pass the sulfur dioxide gas which remains after a first conversion attempt through a second catalytic converter and absorption tower, thus generating a higher conversion efficiency and minimizing the ultimate gas emissions into the atmosphere. The dual absorption system is relatively new, and although it has been used extensively in Europe it has only recently emerged in the United States as a viable method of sulfuric acid production. At the time of EPA testing in preparation for the standards only one dual absorption plant was in operation

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[15] *See* Comments of Manufacturing Chemists Assoc. in No. 72-1072, J.A. at 121, 134:

> [Recycle plants] of necessity operate on a weaker feed gas of lower oxygen content, for a larger or smaller portion of the oxygen of the combustion air has been consumed by the carbon and hydrogen contents of the sulfur source.
>
> The lower sulfur dioxide and oxygen concentrations of the feed gas both make it more difficult to achieve a high degree of conversion of SO(2) to SO(3) in the catalyst bed and require that larger volumes of gas be processed to manufacture a given quantity of sulfuric acid.

[16] As noted, approximately 68 per cent of the contact process sulfuric acid in the United States is produced from elemental sulfur, with the remaining acid produced from spent alkylation acid and acid sludge from petroleum refineries (18½ per cent); tail gas from smelters (9 per cent); iron pyrites (4½ per cent); and hydrogen sulfide. *See* Control of Air Pollution from Sulfuric Acid Plants (Rough Draft) (EPA, Durham, North Carolina, August, 1971) [Control Document], J.A. in No. 72-1072 at 296, 301.

in the United States, an elemental sulfur burning plant owned by the American Cyanamid Company.[17]

The EPA standards are applied to all types of contact process sulfuric acid plants, whether single or dual absorption and whether designed for use with elemental or recycle feedstock.[18] The standards are based on information and data derived from (1) inspections and stack tests of existing facilities; (2) consultations with operators, designers, and state and local control officials; and (3) review of available literature on the subject. The EPA must rely upon the dual-absorption system as the adequately demonstrated system which will meet the standards for new elemental sulfur burning plants, and on a sodium sulfite-bisulfite scrubbing system as the adequately demonstrated

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[17] *See* Comment of American Cyanamid Co. in No. 72-1072, J.A. at 267; Control Document, *supra* note 16, J.A. at 325; Background Information for Proposed New-Source Performance Standards [Background Information Document], J.A. in No. 72-1072 at 48, 57. The Supplemental Statement filed by the EPA on March 21, 1972, 37 Fed. Reg. 5770, indicates that as of March, 1972, there were three dual-absorption plants in operation in the United States, only a small percentage of the 76 designed or constructed throughout the world. One sulfite scrubbing process, the Olin Chemicals plant at Paulsboro, New Jersey, was in operation and tested by the EPA prior to the promulgation of the standards. *See* Comments of Olin Chemicals in No. 72-1072, J.A. at 242, *and* Background Information Document, *supra*, J.A. at 58. Four additional scrubbing systems were scheduled for activation in 1972.

[18] 40 C.F.R. § 60.81 provides that the standards shall apply to:

> "[A]ny facility producing sulfuric acid by the contact process by burning elemental sulfur, alkylation acid, hydrogen sulfide, organic sulfides and mercaptans, or acid sludge, but does not [apply to] facilities where conversion to sulfuric acid is utilized primarily as a means of preventing emissions to the atmosphere of sulfur dioxide or other sulfur compounds.

The exempted facilities are generally metallurgical plants that use acid plants for sulfur dioxide control purposes. *See* paragraph 15 of the EPA's statement accompanying publication of the final regulations, 36 Fed. Reg. 24876 (December 23, 1971) *and* Comment of the American Mining Congress in No. 72-1072, J.A. at 168, 172.

system which will meet the standards for the new recycle and modified existing plants which become subject to the standards.[19] The acid mist standard is based on a system of "high-efficiency acid-mist eliminators, including both fiber demisters and wire and tube electrostatic precipitators." [20]

1. *Elemental Sulfur Feedstock—Sulfur Dioxide Standards*

Petitioners do not object to the EPA's selection of dual absorption as the "best system of emission reduction" which has been "adequately demonstrated" for use in elemental sulfur burning plants. They state in their Reply Brief: [21]

> Petitioners . . . object to EPA's implications that industry is unwilling to utilize the best control technologies. Industry is agreeable to using dual absorption technology, which EPA finds best for the 80% of the industry that uses elemental sulfur feedstocks.

It is the designation of 4.0 lbs. of sulfur dioxide per ton of sulfuric acid produced as the "limitation achievable" through use of the dual absorption system that strikes the discordant note. Petitioners assert that the standard is unrealistically high, not based on the evidence in the record,

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[19] Although in the Supplemental Statement published on March 21, 1973, 37 Fed. Reg. 5770, the EPA indicated that the dual absorption process would be used to control sulfur burning plants *and* "many spent acid plants," there is nothing in the record to indicate any basis for the conclusion that the dual absorption process can perform efficiently in a recycle, or spent acid, plant. As such, dual absorption simply has not been "adequately demonstrated" within the meaning of § 111(a)(1) of the Clean Air Act, as amended, 42 U.S.C. § 1857c-6(a)(1) (1970), for use with other than elemental sulfur feedstock plants.

[20] Background Information Document, *supra* note 17, J.A. at 58.

[21] Reply Brief for Petitioners in No. 72-1072 at 23 n.l.

and hence arbitrary and unreasonable. The bulk of the comments received by the EPA from interested parties—generally industrial companies subject to the controls—suggest a standard of 6.5 lbs./ton as a more reasonable alternative.

The EPA bases the 4.0 lbs./ton standard in three separate sources of information: (1) EPA supervised tests at the Warners Plant of the American Cyanamid Co. on February 17 and 18, 1971; (2) Available technical literature providing information on several of the European dual absorption plants; (3) American Cyanamid's own supervised tests at the Warners Plant.[22]

The results of the EPA supervised tests are impressive. Three independent test runs measured sulfur dioxide emissions of less than 2.0 lbs./ton. Yet for purposes of our review the relevancy of the test results is at best minimal, for as petitioners correctly point out the test data clearly indicate that during the tests acid production in the plant was only at approximately 52% of capacity. Since the regulations specifically provide that performance tests "shall be conducted while the affected facility is operating at or above the maximum acid production rate at which such facility will be operated," 40 C.F.R. § 60.85(b), and as nothing appears in the record to indicate any direct proportional relationship between emissions and plant pro-

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[22] *See* Background Information Document, *supra* note 17, J.A. at 57; Summaries of Test Data, J.A. at 66-69; Control Document, *supra* note 16, J.A. at 325-327, 355 n. 10; Supplemental Statement in Connection with Final Promulgation, 37 Fed. Reg. 5770 (March 21, 1972). The Administrator also purported to rely upon discussions with dual absorption plant designers and operators, and state and local officials. Since nothing appears in the record concerning such discussions it is difficult for this court to assess them as a basis for the standards promulgated. *See* Background Information Document, *supra*, J.A. at 56, *and* Supplemental Statement in Connection with Final Promulgation, 37 Fed. Reg. 5770 (March 21, 1972).

duction levels,[23] we are hard pressed to find much support for the EPA standards on the basis of these test results. A similar vice affects the relevancy of the literature regarding the European plants, for while purporting to show impressive emission controls—three of the plants reportedly average emissions of less than 3.0 lbs./ton—no data are provided indicating at what percentage capacity the various plants were operating when these results were obtained.[24]

Filed with the comments of the American Cyanamid Co. were summaries of many of the company's own tests of its Warners Plant,[25] including the test data which prompted the EPA to state in the Background Information for Proposed New-Source Performance Standards [Background Document], J.A. at 57:

> Testing by the operator showed full-load SO(2) emissions to be consistently less than 4.0 pounds of SO(2) per ton of acid, with emissions below 3.0 pounds per ton much of the time.

While the test results hardly support the EPA's allegation of full-load emissions "consistently less" than 4.0 lbs./ton, they do suffice to convince us of the reasoned decisionmaking of the Administrator. The Warners Plant is designed for a conversion efficiency (percentage of SO(2) conversion to SO(3)) of 99.5, which amounts to a design expectancy of sulfure dioxide emissions in the 6.5 lbs./ton range.[26] The test results, however, both as reported by the EPA and as clarified and expanded in American Cyana-

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[23] The raw test data submitted by American Cyanamid Co. would seem to indicate the possibility of a roughly proportional relationship between the two. *See* Comment of American Cyanamid Co. in No. 72-1072, J.A. at 267.

[24] *See* Control Document, *supra* note 16, J.A. at 326.

[25] *See* Comment of American Cyanamid Co. in No. 72-1072, J.A. at 267-70.

[26] *See* Brief for Petitioners in No. 72-1072 at 22.

mid's data, show that on three occasions when production was at or near full capacity emission levels of only 2.7, 3.5, and 4.0 lbs./ton were recorded. In fact, the *average* of the nineteen readings taken when the plant was near full capacity is approximately 4.6 lbs./ton. In sum, the proposed standard was exceeded on two occasions, equalled on another, and nearly equalled on the average of nineteen different readings. Keeping in mind Congress' intent that new plants be controlled to the "maximum practicable degree,"[27] we find that the 4.0 lbs./ton standard based on a dual absorption system for new elemental sulfur burning plants is the result of the exercise of reasoned discretion by the Administrator and cannot be upset by this court.

The petitioners additionally challenge what they feel to be an inadequate consideration of economic costs in the selection of the 4.0 lbs./ton standard. Essentially what they seek is a cost-benefit analysis comparing their desired 6.5 lbs./ton standard with the standard ultimately adopted.[28] Again, we affirmatively defer to the *Portland Cement* decision, *supra*, slip op. at 22-23:

> However desirable in the abstract, such a requirement would conflict with the specific time constraints imposed on the Administrator. The difficulty, if not impossibility, of quantifying the benefit to ambient air conditions, further militates against the imposition of such an imperative on the agency. Such studies should be considered by the Administrator, if adduced in comments, but we do not inject them as a necessary condition of action. (Footnote omitted.)

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[27] Summary of the Provisions of Conference Agreement on the Clean Air Amendments of 1970, 116 CONG. REC. 42384, 42385 (1970).

[28] *See, e.g.*, Comments on Stauffer Chemical Co. in No. 72-1072, J.A. at 73, 77, 81-82; Comments of Allied Chemical Corp. in No. 72-1072, J.A. at 240-41; Brief for Petitioners in No. 72-1072 at 61-65.

The record amply supports the EPA's contention that it has taken economic costs into account in selecting the best system, whether that system be dual absorption, the sodium sulfite-bisulfite scrubber, or acid mist controls.[29] It is not unlikely that industry and the EPA will disagree on the economic costs of these various control techniques. We have no desire or special ability to settle such a dispute, but we do find that the Administrator has considered economic costs as required by § 111 of the Act, 42 U.S.C. § 1857c-6(a)(1) (1970), and that his consideration is reasoned.[30]

2. *Recycle Plants—Sulfur Dioxide Standard*

In contrast to the petitioners' position concerning elemental sulfur feedstock plants and the dual absorption system, their challenge regarding recycle plants is directed more to the sodium sulfite-bisulfite scrubber as the "best system . . . adequately demonstrated" than to whether the 4.0 lbs./ton standard is "achievable" thereunder.

The standard as applied to recycle plants must be analyzed through the utilization of a sodium sulfite-bisulfite scrubbing system, for there exists no data in the record supporting the proposition that any other system, dual

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[29] *See* Background Information Document, *supra* note 17, J.A. at 60-61; Control Document, *supra* note 16, J.A. at 345-53; Supplemental Statement in Connection with Final Promulgation, 37 Fed. Reg. 5770-71 (March 21, 1972).

[30] None of the procedural abuses present in Portland Cement Assoc. v. Ruckelshaus, No. 72-1073 (D.C. Cir. June 29, 1973), are alleged in this case or appear evident from the record. The comments filed with the EPA prior to promulgation of final standards show an awareness on the part of all parties involved of the test data and literature upon which the proposed regulations were based. No challenge was directed at the accuracy of the test results. *See* Comments of Manufacturing Chemists Assoc. in No. 72-1072, J.A. at 136: "Three tests were run by EPA and the company [American Cyanamid] has acknowledged that the results of these tests are accurate within reasonable analytical limits."

absorption or otherwise, has been adequately demonstrated for use in such plants.[31] A scrubbing system is separate from the acid producing process and differs from dual absorption in that it achieves emission reduction not by directly recycling unconverted sulfur dioxide gas back into the system, but by extracting the sulfur dioxide gas out of the exit gas stream through exposure to a sodium sulfite solution. This produces sodium bisulfite which upon heating yields sulfur dioxide gas (then fed back into the acid producing system) and sodium sulfite (then returned to combine again with sulfur dioxide in the exit gas stream). In order to retain high efficiency levels in the scrubbing system it is necessary to continuously add new solution and to drain off part of the old solution as "purge."[32] The purge is collected in significant amounts, up to 52 lbs./ton of acid produced, and thus presents noteworthy disposal problems.[33]

Despite petitioners' protestations concerning the "ideal" conditions under which the EPA conducted its tests, we find adequate support for the conclusion that the standard is achievable in the results of tests conducted at the Olin Chemicals Co. plant in Paulsboro, New Jersey. The tests were conducted under EPA supervision on March 26 and 27, 1971, when the Paulsboro plant was the only active recycle plant in the United States equipped with a sodium sulfite-bisulfite scrubber.[34] The results are impressive, re-

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[31] *See* note 19 *supra*.

[32] Some of the sulfite and bisulfite becomes sulfate, which if allowed to collect will reduce and/or destroy the efficiency of the scrubber system.

[33] *See* Comments of E. I. duPont de Nemours & Co. in No. 72-1072, J.A. at 260.

[34] *See* Background Information Document, *supra* note 17, J.A. at 57-58; Control Document, *supra* note 16, J.A. at 328-31; *and* Supplement Statement in Connection with Final Promulgation, 37 Fed. Reg. 5770 (March 21, 1972): "One sulfite scrubbing process is now in operation in the United States and four more will be

flecting sulfur dioxide emission levels of 2.59 and 2.85 lbs./ton, well below the standard. Equally important, however, is the fact that the tests were conducted when the plant was operating at or near full capacity.

As we have earlier noted, § 111 of the Act, 42 U.S.C. § 1857c-6(a)(1) (1970), requires that when the Administrator makes his "best system" and "achievable limitation" determination that he "take into account counter-productive environmental effects."[35] We cannot conclude on the basis of the record before us that the Administrator met this obligation in promulgating a standard to be applied to recycle acid plants. The record evidence indicates that the standard is achievable only through use of a sodium sulfite-bisulfite scrubber, yet no consideration of the significant land or water pollution potential resulting from disposal of the 52 lbs./ton liquid purge byproduct is apparent. A 700 ton/day sulfuric acid plant operating at capacity will produce nearly twenty tons of the purge waste in only one day of operation, and while the scrubber will effectively cut air emissions from a 50 to 100 lbs./ton level its "counter-productive environmental effects" cannot be ignored.[36] Judge Leventhal's statement in *Portland Cement*, *supra*, slip op. at 19 n. 42, that "we cannot imagine that Congress intended that 'best' could apply to a system which did more damage to water than it prevented to air," seems particularly apropos.

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put into service in 1972. All are retrofit installations." Similar to the comments regarding the EPA test results obtained in the dual absorption Warners Plant, *see* note 30 *supra*, the Comments of the Manufacturing Chemists Assoc. in No. 72-1072, J.A. at 136 state: "Data presented in 'Control of Air Pollution from Sulfuric Acid Plants' which relate to the Olin Corporation's sulfite-bisulfite system are correctly stated."

[35] *See* text at note 7 *supra*, *and* note 7 *supra*.

[36] Most plants operate at least at 94 per cent efficiency which results in emissions generally in the 50 to 100 lbs./ton range. *See* Control Document, *supra* note 16, J.A. at 315.

We realize that the only apparent alternative to the scrubbing system is no control at all.[37] Since recycle plants amount to only about twenty percent of the country's sulfuric acid plants, and since collectively the sulfuric acid plants in this country account for only about two per cent of the sulfur dioxide emission, such an alternative (at least in selected instances) might prove best for the environment as a whole.[38] We have no way of knowing; it is something the EPA is uniquely suited to determine. We do know, however, that the feeble statements in the Background Document that "[m]ethods for disposing of these products will have to be considered by plant operators," and "process designers are investigating several means of handling these wastes," are poor substitutes for the reasoned consideration of this problem that is required.[39] The record is thus remanded to the Administrator for further consideration and explanation of the adverse environmental effects of requiring a 4.0 lbs./ton standard for recycle acid plants.[40]

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[37] *See* note 19 *supra*. The EPA Control Document, *supra* note 16, J.A. at 332-35, discusses scrubber systems other than the sodium sulfite-bisulfite type, but also states, J.A. at 328:

> To date only the sodium sulfite-bisulfite process has been demonstrated to be capable of meeting the SO(2) limit when taking cost into consideration. Others such as ammonia scrubbing can meet the standard but costs are highly dependent on the marketability of by-products for which there may be little demand.

Petitioners suggest that the EPA set the standard for recycle plants at 10 lbs./ton and base it upon use of a dual absorption system. There is no evidence in the record to support such an alternative.

[38] *See* Control Document, *supra* note 16, J.A. at 300, *and* Comments of Manufacturing Chemists Assoc. in No. 72-1072, J.A. at 134.

[39] Background Information Document, *supra* note 17, J.A. at 58.

[40] We do not intimate what should be done or necessarily that the current standard will have to be changed, but only that the record does not demonstrate adequate consideration of the issue.

3. *Acid Mist Emissions*

Our review of the record leads us to conclude that ample evidence exists, in terms of both technical literature and results of EPA conducted tests, to satisfy us of the reasoned nature of the EPA's acid mist standard.[41] The standard, 0.15 lb. of sulfuric acid mist per ton of acid produced, is deemed achievable through the use of either electrostatic or fiber precipitator systems, both of which are certainly adequately demonstrated.[42] Petitioners' objections regarding the result oriented definition of acid mist (*i.e.*, whatever the prescribed method for testing detects, as opposed to the "accepted definition" of "liquid particulate matter exclusive of gas") is considered, but we cannot say that the Administrator was arbitrary in promulgating such a definition.[43]

IV.

Reviewing the coal-fired steam generator standards promulgated for particulate matter, sulfur dioxide, and nitrogen oxides, *see* 40 C.F.R. § 60.40 *et seq.*, and subjecting them to the various tests and scopes of inquiry discussed above, we find that with but one exception the record evidence supports the conclusion that they are the

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[41] *See* Background Information Document, *supra* note 17, J.A. at 58-60; Control Document, *supra* note 16, J.A. at 336-342, and literature sources noted therein.

[42] The demister systems are both commonly employed in industry, with fiber demisters the more popular of the two. *See* Background Information Document, *supra* note 17, J.A. at 58; Control Document, *supra* note 16, J.A. at 337.

[43] For summaries of the petitioners' complaints regarding the definition, *see* Comments of Manufacturing Chemists Assoc. in No. 72-1072, J.A. at 139-40, *and* Chemical Construction Corp., J.A. at 359-60. In the Supplemental Statement in Connection with Final Promulgation the EPA noted, 37 Fed. Reg. 5770 (March 21, 1972): "Complaints from the industry that it cannot meet the acid mist standard appear to be based on experience with other test methods than EPA's."

result of reasoned decision-making.[44] The evidence, including tests of prototype and full-scale control systems, considerations of available fuel supplies, literature sources, and documentation of manufacturer guarantees and expectations, convinces us that the systems proposed are adequately demonstrated, that cost has been taken into consideration, and that the emission standards are achievable.[45] *See* 42 U.S.C. § 1857c-6(a)(1) (1970). Although in the instance of the sulfur dioxide standards and the lime slurry scrubbing system the EPA tests give results indicating that a presently installed unit approaches rather than achieves the 1.2 lbs. million B.t.u. heat input standard,[46] when the results are considered in conjunction with the prototype testing data and the predictions and guarantees of domestic equipment manufacturers for plants under construction,[47] we cannot say that the standard

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[44] The standard for particulate matter, defined in 40 C.F.R. § 60.41(e) as "any finely divided liquid or solid material, other than uncombined water, as measured by Method 5," is set at 0.10 lb. per million B.t.u. heat input; the standard for sulfur dioxide is set at 1.2 lbs./million; the standard for nitrogen oxides is set at 0.7 lbs./million. The standards contemplate the use of and vary according to the type of fuel used, either solid, liquid, or gaseous. Only the standards for solid fossil fuel are challenged in No. 72-1079.

[45] *See* Background Information for Proposed New-Source Performance Standards [Background Information Document], J.A. in No. 72-1079 at 22-42; Summaries of Test Data [Test Data], J.A. in No. 72-1079 at 43-68; Supplemental Statement in Connection with Final Promulgation, 37 Fed. Reg. 5767-5770 (March 21, 1972).

[46] *See* Background Information Document, *supra* note 45, J.A. at 35; Test Data, *supra* note 45, J.A. at 58, 62.

[47] *See* Background Information Document, *supra* note 45, J.A. at 35; Supplemental Statement in Connection with Final Promulgation, 37 Fed. Reg. 5768, table #1 (March 21, 1972), which shows that companies such as Monsanto, Zurn, Babcock & Wilcox, are guaranteeing better than 80 percent sulfur dioxide removal

represents "a clear error of judgment." *See Citizens to Preserve Overton Park* v. *Volpe, supra*, 401 U.S. at 416.

A lime slurry scrubbing system is the anticipated "best system" for use in coal-fired steam generators which burn coal of such a high sulfur content that separate control mechanisms are necessary to meet the standard.[48] This scrubbing system, like the sodium sulfite-bisulfite system used in sulfuric acid plants, produces significant quantities of sludge byproduct which present substantial disposal problems. The counter productive environmental effects of the system were noted in comments to the EPA,[49] but the Administrator's consideration of the issue, at least as it appears on the record, is insufficient. The only statement in the Background Information for Proposed New-Source Performance Standards concerning such is merely an admission of the problem:

> Lime-scrubbing systems are essentially throwaway processes that produce significant quantities of solid waste. For a 3.0-percent-sulfur coal, the additional wastes are roughly equal to the ash generated from burning coal.[50]

Consequently, the record is remanded for further consideration and explanation by the Administrator of the

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on plants now under construction and using a lime scrubbing process. "Generally, the standard of 1.2 . . . can be met by the removal of 70-75 percent of the sulfur dioxide formed in the burning of coal of average sulfur content (i.e., 2.8—3 percent)." *Id.*

[48] *See* Background Information Document, *supra* note 45, J.A. at 34. It is possible through the burning of generally unavailable low sulfur content coal to meet the sulfur dioxide emission standards without the assistance of any control mechanism. *Id.* at 29.

[49] *See* Comments of Edison Electric Institute in No. 72-1079, J.A. at 130; Comments of Babcock & Wilcox Co. in No. 72-1079, J.A. at 171.

[50] Background Information Document, *supra* note 45, J.A. at 35.

adverse environmental effects of requiring a 1.2 lbs./million standard for those coal-fired steam generator plants which must use a lime slurry scrubbing system as the only means of achieving the standard.[51]

Accordingly, the record in No. 72-1072 and No. 72-1079 is remanded to the Administrator of the Environmental Protection Agency for further proceedings not inconsistent with this opinion.

So Ordered.

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[51] We want to reiterate, *see* note 40 *supra*, that we express no view as to what the standards ultimately should be with regard to such plants. Perhaps some flexible standard should be adopted which recognizes that the lime slurry scrubber system should be used only where necessary to meet the EPA's primary ambient air standards, or perhaps in balance the counter productive effects of the system are outweighed by the need for cleaner air. We only want to be sure in view of the significant problem posed in the record that the Administrator has acted reasonably in promulgating the standard.

UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

SEPTEMBER TERM, 1973

No. 72-1079

APPALACHIAN POWER COMPANY
INDIANA & MICHIGAN ELECTRIC COMPANY
KENTUCKY POWER COMPANY
OHIO POWER COMPANY,
Petitioners

v.

ENVIRONMENTAL PROTECTION AGENCY,
Respondent

Before: Wright and Tamm, Circuit Judges; Davies,* Senior United States District Judge for the District of North Dakota.

ORDER

(filed Oct. 3, 1973)

On consideration of petitioners' petition for rehearing, it is

ORDERED by the court that petitioners' aforesaid petition is denied.

Per Curiam

For the Court:

/s/ Hugh E. Kline
HUGH E. KLINE
Clerk

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* Sitting by designation pursuant to Title 28 U.S. Code Section 294(d).

Pertinent Provisions of the Clean Air Act, as amended, 42 U.S.C. §§ 1857 et seq. (1970):

§ 1857. Congressional findings; purposes of subchapter.

(a) The Congress finds—

(1) that the predominant part of the Nation's population is located in its rapidly expanding metropolitan and other urban areas, which generally cross the boundary lines of local jurisdictions and often extend into two or more States;

(2) that the growth in the amount and complexity of air pollution brought about by urbanization, industrial development, and the increasing use of motor vehicles, has resulted in mounting dangers to the public health and welfare, including injury to agricultural crops and livestock, damage to and the deterioration of property, and hazards to air and ground transportation;

(3) that the prevention and control of air pollution at its source is the primary responsibility of States and local governments; and

(4) that Federal financial assistance and leadership is essential for the development of cooperative Federal, State, regional, and local programs to prevent and control air pollution.

(b) The purposes of this subchapter are—

(1) to protect and enhance the quality of the Nation's air resources so as to promote the public health and welfare and the productive capacity of its population;

(2) to initiate and accelerate a national research and development program to achieve the prevention and control of air pollution;

(3) to provide technical and financial assistance to State and local governments in connection with the development and execution of their air pollution prevention and control programs; and

(4) to encourage and assist the development and operation of regional air pollution control programs.

§ 1857c-6. Standards of performance for new stationary sources.

(a) Definitions.

For purposes of this section:

(1) The term "standard of performance" means a standard for emissions of air pollutants which reflects the degree of emission limitation achievable through the application of the best system of emission reduction which (taking into account the cost of achieving such reduction) the Administrator determines has been adequately demonstrated.

(2) The term "new source" means any stationary source, the construction or modification of which is commenced after the publication of regulations (or, if earlier, proposed regulations) prescribing a standard of performance under this section which will be applicable to such source.

(3) The term "stationary source" means any building, structure, facility, or installation which emits or may emit any air pollutant.

(4) The term "modification" means any physical change in, or change in the method of operation of, a stationary source which increases the amount of any air pollutant emitted by such source or which results in the emission of any air pollutant not previously emitted.

(5) The term "owner or operator" means any person who owns, leases, operates, controls, or supervises a stationary source.

(6) The term "existing source" means any stationary source other than a new source.

(b) Publication and revision by Administrator of list of categories of stationary sources; inclusion of category in list; proposal of regulations by Administrator establishing

standards for new sources within category; promulgation and revision of standards; differentiation within categories of new sources; issuance of information on pollution control techniques; applicability to new sources owned or operated by United States.

(1)(A) The Administrator shall, within 90 days after December 31, 1970, publish (and from time to time thereafter shall revise) a list of categories of stationary sources. He shall include a category of sources in such list if he determines it may contribute significantly to air pollution which causes or contributes to the endangerment of public health or welfare.

(B) Within 120 days after the inclusion of a category of stationary sources in a list under subparagraph (A), the Administrator shall propose regulations, establishing Federal standards of performance for new sources within such category. The Administrator shall afford interested persons an opportunity for written comment on such proposed regulations. After considering such comments, he shall promulgate, within 90 days after such publication, such standards with such modifications as he deems appropriate. The Administrator may, from to time, revise such standards following the procedure required by this subsection for promulgation of such standards. Standards of performance or revisions thereof shall become effective upon promulgation.

(2) The Administrator may distinguish among classes, types and sizes within categories of new sources for the purpose of establishing such standards.

(3) The Administrator shall, from time to time, issue information on pollution control techniques for categories of new sources and air pollutants subject to the provisions of this section.

(4) The provisions of this section shall apply to any new source owned or operated by the United States.

(c) Implementation and enforcement by State; procedure; delegation of authority of Administrator to State; enforcement power of Administrator unaffected.

(1) Each State may develop and submit to the Administrator a procedure for implementing and enforcing standards of performance for new sources located in such State. If the Administrator finds the State procedure is adequate, he shall delegate to such State any authority he has under this chapter to implement and enforce such standards (except with respect to new sources owned or operated by the United States).

(2) Nothing in this subsection shall prohibit the Administrator from enforcing any applicable standard of performance under this section.

(d) Emission standards for any existing source for any air pollutant; submission of State plan to Administrator establishing, implementing and enforcing standards; authority of Administrator to prescribe State plan; authority of Administrator to enforce State plan; procedure.

(1) The Administrator shall prescribe regulations which shall establish a procedure similar to that provided by section 1857c-5 of this title under which each State shall submit to the Administrator a plan which (A) establishes emission standards for any existing source for any air pollutant (i) for which air quality criteria have not been issued or which is not included on a list published under section 1857c-3(a) or 1857c-7(b)(1)(A) of this title but (ii) to which a standard of performance under subsection (b) of this section would apply if such existing source were a new source, and (B) provides for the implementation and enforcement of such emission standards.

(2) The Administrator shall have the same authority—

(A) to prescribe a plan for a State in cases where the State fails to submit a satisfactory plan as he would have

under section 1857c-5(c) of this title in the case of failure to submit an implementation plan, and

(B) to enforce the provisions of such plan in cases where the State fails to enforce them as he would have under sections 1857c-8 and 1857c-9 of this title with respect to an implementation plan.

(e) Prohibited acts.

After the effective date of standards of performance promulgated under this section, it shall be unlawful for any owner or operator of any new source to operate such source in violation of any standard of performance applicable to such source.

§ 1857h-5. Administrative proceedings and judicial review.

(a)(1) In connection with any determination under section 1857c-5(f) or section 1857f-1(b)(5) of this title, or for purposes of obtaining information under section 1857f-1(b)(4) or 1857f-1(c)(4) of this title, the Administrator may issue subpenas for the attendance and testimony of witnesses and the production of relevant papers, books, and documents, and he may administer oaths. Except for emission data, upon a showing satisfactory to the Administrator by such owner or operator that such papers, books, documents, or information or particular part thereof, if made public, would divulge trade secrets or secret processes of such owner or operator, the Administrator shall consider such record, report, or information or particular portion thereof confidential in accordance with the purposes of section 1905 of Title 18, except that such paper, book, document, or information may be disclosed to other officers, employees, or authorized representatives of the United States concerned with carrying out this chapter, to persons carrying out the National Academy of Sciences' study and investigation provided for in section 1857f-1(c) of this title, or when relevant in any proceeding under this chapter. Witnesses summoned shall be paid the same fees and mileage

that are paid witnesses in the courts of the United States. In case of contumacy or refusal to obey a subpena served upon any person under this subparagraph, the district court of the United States for any district in which such person is found or resides or transacts business, upon application by the United States and after notice to such person, shall have jurisdiction to issue an order requiring such person to appear and give testimony before the Administrator to appear and produce papers, books, and documents before the Administrator, or both, and any failure to obey such order of the court may be punished by such court as a contempt thereof.

(b)(1) A petition for review of action of the Administrator in promulgating any national primary or secondary ambient air quality standard, any emission standard under section 1857c-7 of this title, any standard of performance under section 1857c-6 of this title, any standard under section 1857f-1 of this title (other than a standard required to be prescribed under section 1857f-1(b)(1) of this title), any determination under section 1857f-1(b)(5) of this title, any control or prohibition under section 1857f-6c of this title or any standard under section 1857f-9 of this title may be filed only in the United States Court of Appeals for the District of Columbia. A petition for review of the Administrator's action in approving or promulgating any implementation plan under section 1857c-5 of this title or section 1857c-6(d) of this title, may be filed only in the United States Court of Appeals for the appropriate circuit. Any such petition shall be filed within 30 days from the date of such promulgation or approval, or after such date if such petition is based solely on grounds arising after such 30th day.

(2) Action of the Administrator with respect to which review could have been obtained under paragraph (1) shall not be subject to judicial review in civil or criminal proceedings for enforcement.

(c) In any judicial proceeding in which review is sought of a determination under this chapter required to be made

on the record after notice and opportunity for hearing, if any party applies to the court for leave to adduce additional evidence, and shows to the satisfaction of the court that such additional evidence is material and that there were reasonable grounds for the failure to adduce such evidence in the proceeding before the Administrator, the court may order such additional evidence (and evidence in rebuttal thereof) to be taken before the Administrator, in such manner and upon such terms and conditions as to the court may deem proper. The Administrator may modify his findings as to the facts, or make new findings, by reason of the additional evidence so taken and he shall file such modified or new findings, and his recommendation, if any, for the modification or setting aside of his original determination, with the return of such additional evidence.

Pertinent Provisions of the National Environmental Policy Act, 42 U.S.C. §§ 4321, 4331-4335 (1970):

§ 4321. Congressional declaration of purpose.

The purposes of this chapter are: To declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation; and to establish a Council on Environmental Quality.

§ 4331. Congressional declaration of national environmental policy.

(a) The Congress, recognizing the profound impact of man's activity on the interrelations of all components of the natural environment, particularly the profound influences of population growth, high-density urbanization, industrial expansion, resource exploitation, and new and expanding technological advances and recognizing further the critical importance of restoring and maintaining environmental quality to the overall welfare and development of man, declares that it is the continuing policy of the Federal Gov-

ernment, in cooperation with State and local governments, and other concerned public and private organizations, to use all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fullfill the social, economic, and other requirements of present and future generations of Americans.

(b) In order to carry out the policy set forth in this chapter, it is the continuing responsibility of the Federal Government to use all practicable means, consistent with other essential considerations of national policy, to improve and coordinate Federal plans, functions, programs, and resources to the end that the Nation may—

(1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;

(2) assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings;

(3) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;

(4) preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity and variety of individual choice;

(5) achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and

(6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

(c) The Congress recognizes that each person should enjoy a healthful environment and that each person has a responsibility to contribute to the preservation and enhancement of the environment.

§ 4332. Cooperation of agencies: reports: availability of information: recommendations: international and national coordination of efforts.

The Congress authorizes and directs that, to the fullest extent possible: (1) the policies, regulations, and public laws of the United States shall be interpreted and administered in accordance with the policies set forth in this chapter, and (2) all agencies of the Federal Government shall—

(A) utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and in decisionmaking which may have an impact on man's environment;

(B) identify and develop methods and procedures, in consultation with the Council on Environmental Quality established by subchapter II of this chapter, which will insure that presently unquantified environmental amenities and values may be given appropriate consideration in decisionmaking along with economic and technical considerations;

(C) include in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official on—

(i) the environmental impact of the proposed action,

(ii) any adverse environmental effects which cannot be avoided should the proposal be implemented,

(iii) alternatives to the proposed action,

(iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and

(v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.

Prior to making any detailed statement, the responsible Federal official shall consult with and obtain the comments of any Federal agency which has jurisdiction by law or special expertise with respect to any environmental impact involved. Copies of such statement and the comments and views of the appropriate Federal, State, and local agencies, which are authorized to develop and enforce environmental standards, shall be made available to the President, the Council on Environmental Quality and to the public as provided by section 552 of Title 5, and shall accompany the proposal through the existing agency review processes;

(D) study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources;

(E) recognize the worldwide and long-range character of environmental problems and, where consistent with the foreign policy of the United States, lend appropriate support to initiatives, resolutions, and programs designed to maximize international cooperation in anticipating and preventing a decline in the quality of mankind's world environment;

(F) make available to States, counties, municipalities, institutions, and individuals, advice and information useful in restoring, maintaining, and enhancing the quality of the environment;

(G) initiate and utilize ecological information in the planning and development of resource-oriented projects; and

(H) assist the Council on Environmental Quality established by subchapter II of this chapter.

§ 4333. Conformity of administrative procedures to national environmental policy.

All agencies of the Federal Government shall review their present statutory authority, administrative regulations, and current policies and procedures for the purpose of determin-

ing whether there are any deficiencies or inconsistencies therein which prohibit full compliance with the purposes and provisions of this chapter and shall propose to the President not later than July 1, 1971, such measures as may be necessary to bring their authority and policies into conformity with the intent, purposes, and procedures set forth in this chapter.

§ 4334. Other statutory obligations of agencies.

Nothing in section 4332 or 4333 of this title shall in any way affect the specific statutory obligations of any Federal agency (1) to comply with criteria or standards of environmental quality, (2) to coordinate or consult with any other Federal or State agency, or (3) to act, or refrain from acting contingent upon the recommendations or certification of any other Federal or State agency.

§ 4335. Efforts supplemental to existing authorizations.

The policies and goals set forth in this chapter are supplementary to those set forth in existing authorizations of Federal agencies.

Title 40—Protection of Environment

Chapter I—Environmental Protection Agency

SUBCHAPTER C—AIR PROGRAMS

PART 60—STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES [36 Fed. Reg. 24876-77 (December 23, 1971)]

On August 17, 1971 (36 F.R. 15704) pursuant to section 111 of the Clean Air Act, as amended, the Administrator proposed standards of performance for steam generators, portland cement plants, incinerators, nitric acid plants, and sulfuric acid plants. The proposed standards, applicable to sources the construction or modification of which was initiated after August 17, 1971, included emission limits for one or more of four pollutants (particulate matter, sulfur dioxide, nitrogen oxides, and sulfuric acid mist) for each source category. The proposal included requirements for

performance testing, stack gas monitoring, record keeping and reporting, and procedures by which EPA will provide preconstruction review and determine the applicability of the standards to specific sources.

Interested parties were afforded an opportunity to participate in the rule making by submitting comments. A total of more than 200 interested parties, including Federal, State, and local agencies, citizens groups, and commercial and industrial organizations submitted comments. Following a review of the proposed regulations and consideration of the comments, the regulations, including the appendix, have been revised and are being promulgated today. The principal revisions are described below:

1. Particulate matter performance testing procedures have been revised to eliminate the requirement for impingers in the sampling train. Compliance will be based only on material collected in the dry filter and the probe preceding the filter. Emission limits have been adjusted as appropriate to reflect the change in test methods. The adjusted standards require the same degree of particulate control as the originally proposed standards.

2. Provisions have been added whereby alternative test methods can be used to determine compliance. Any person who proposes the use of an alternative method will be obliged to provide evidence that the alternative method is equivalent to the reference method.

3. The definition of modification, as it pertains to increases in production rate and changes of fuels, has been clarified. Increases in production rates up to design capacity will not be considered a modification nor will fuel switches if the equipment was originally designed to accommodate such fuels. These provisions will eliminate inequities where equipment had been put into partial operation prior to the proposal of the standards.

4. The definition of a new source was clarified to include construction which is completed within an organization as

well as the more common situations where the facility is designed and constructed by a contractor.

5. The provisions regarding requests for EPA plan review and determination of construction or modification have been modified to emphasize that the submittal of such requests and attendant information is purely voluntary. Submittal of such a request will not bind the operator to supply further information; however, lack of sufficient information may prevent the Administrator from rendering an opinion. Further provisions have been added to the effect that information submitted voluntarily for such plan review or determination of applicability will be considered confidential, if the owner or operator requests such confidentiality.

6. Requirements for notifying the Administrator prior to commencing construction have been deleted. As proposed, the provision would have required notification prior to the signing of a contract for construction of a new source. Owners and operators still will be required to notify the Administrator 30 days prior to initial operation and to confirm the action within 15 days after startup.

7. Revisions were incorporated to permit compliance testing to be deferred up to 60 days after achieving the maximum production rate but no longer than 180 days after initial startup. The proposed regulation could have required testing within 60 days after startup but defined startup as the begining of routine operation. Owners or operators will be required to notify the Administrator at least 10 days prior to compliance testing so that an EPA observer can be on hand. Procedures have been modified so that the equipment will have to be operated at maximum expected production rate, rather than rated capacity, during compliance tests.

8. The criteria for evaluating performance testing results have been simplified to eliminate the requirement that all values be within 35 percent of the average. Compliance

will be based on the average of three repetitions conducted in the specified manner.

9. Provisions were added to require owners or operators of affected facilities to maintain records of compliance tests, monitoring equipment, pertinent analyses, feed rates, production rates, etc. for 2 years and to make such information available on request to the Administrator. Owners or operators will be required to summarize the recorded data daily and to convert recorded data into the applicable units of the standard.

10. Modifications were made to the visible omission standards for steam generators, cement plants, nitric acid plants, and sulfuric acid plants. The Ringelmann standards have been deleted; all limits will be based on opacity. In every case, the equivalent opacity will be at least as stringent as the proposed Ringelmann number. In addition, requirements have been altered for three of the source categories so that allowable emissions will be less than 10 percent opacity rather than 5 percent or less opacity. There were many comments that observers could not accurately evaluate emissions of 5 percent opacity. In addition, drafting errors in the proposed visible emission limits for cement kilns and steam generators were corrected. Steam generators will be limited to visible emissions not greater than 20 percent opacity and cement kilns to not greater than 10 percent opacity.

11. Specifications for monitoring devices were clarified, and directives for calibration were included. The instruments are to be calibrated at least once a day, or more often if specified by the manufacturer. Additional guidance on the selection and use of such instruments will be provided at a later date.

12. The requirement for sulfur dioxide monitoring at steam generators was deleted for those sources which will achieve the standard by burning low-sulfur fuel, provided

that fuel analysis is conducted and recorded daily. American Society for Testing and Materials sampling techniques are specified for coal and fuel oil.

13. Provisions were added to the steam generator standards to cover those instances where mixed fuels are burned. Allowable emissions will be determined by prorating the heat input of each fuel, however, in the case of sulfur dioxide, the provisions allow operators the option of burning low-sulfur fuels (probably natural gas) as a means of compliance.

14. Steam generators fired with lignite have been exempted from the nitrogen oxides limit. The revision was made in view of the lack of information on some types of lignite burning. When more information is developed, nitrogen oxides standards may be extended to lignite fired steam generators.

15. A provision was added to make it explicit that the sulfuric acid plant standards will not apply to scavenger acid plants. As stated in the background document, APTD 0711, which was issued at the time the proposed standards were published, the standards were not meant to apply to such operations, e.g., where sulfuric acid plants are used primarily to control sulfur dioxide or other sulfur compounds which would otherwise be vented into the atmosphere.

16. The regulation has been revised to provide that all materials submitted pursuant to these regulations will be directed to EPA's Office of General Enforcement.

17. Several other technical changes have also been made. States and interested parties are urged to make a careful reading of these regulations.

As required by section 111 of the Act, the standards of performance promulgated herein "reflect the degree of emission reduction which (taking into account the cost of achiev-

ing such reduction) the Administrator determines has been adequately demonstrated". The standards of performance are based on stationary source testing conducted by the Environmental Protection Agency and or contractors and on data derived from various other sources, including the available technical literature. In the comments on the proposed standards, many questions were raised as to costs and **[24877]** demonstrated capability of control systems to meet the standards. These comments have been evaluated and investigated, and it is the Administrator's judgment that emission control systems capable of meeting the standards have been adequately demonstrated and that the standards promulgated herein are achievable at reasonable costs.

The regulations establishing standards of performance for steam generators, incinerators, cement plants, nitric acid plants, and sulfuric acid plants are hereby promulgated effective on publication and apply to sources, the construction or modification of which was commenced after August 17, 1971.

Dated: December 16, 1971.

WILLIAM D. RUCKELSHAUS,
Administrator,
Environmental Protection Agency.

Standards of Performance for New Stationary Sources

Supplemental Statement in Connection with Final Promulgation [37 Fed. Reg. 5767-71 (March 21, 1972)]

I. EPA published Standards of Performance for New Stationary Sources in final form, prefaced by a "concise general statement of their basis and purpose" as required by section 4(c) of the Administrative Procedure Act, 5 U.S.C. 553(c), on December 23, 1971, 36 F.R. 24876. Petitions for review of certain of these standards were filed on January 21 and 24 by the Essex Chemical Corp. et al., the Portland Cement Association, and the Appalachian

Power Co. et al. (U.S. Court of Appeals for the District of Columbia, Nos. 72-1072, 72-1073, and 72-1079).

On February 18, 1972, almost 2 months after EPA published the New Stationary Source Standards, the U.S. Court of Appeals for the District of Columbia Circuit handed down its decision in "Kennecott Copper Corp. v. Environmental Protection Agency" (C.A.D.C. No. 71-1410), which concerned a national secondary ambient air quality standard promulgated by EPA pursuant to section 109(b) of the Clean Air Amendments of 1970, 42 U.S.C. 1857C-4(b). The court there held that although the "concise general statement" prefacing the standard involved satisfied the requirements of section 4(c) of the Administrative Procedure Act, it would nonetheless remand the cause to the Administrator for a more specific explanation of how he had arrived at the standard.

In light of the decision in "Kennecott Copper," and in the interest of a speedy judicial determination of the validity of the Standards of Performance for New Stationary Sources, we have prepared this statement of the basis of the Administrator's decision to promulgate the standards to supplement that appearing as the preface to the final standards as published in December 1971. Although if the point were raised it might ultimately be determined that this statement was not necessary to satisfy the doctrine expressed by the "Kennecott Copper" opinion, EPA considers it fundamental to the national policy embodied in the Clean Air Amendments of 1970 to expedite all steps of promulgation and enforcement of standards and implementation plans to bring about clean air. The speedy eradication of any uncertainty as to the validity of the standards for new stationary sources is an important part of this process. Accordingly, considering the particular sequence of events and pressures of time involved here, we think it most appropriate to include this supplementary statement in the record now, thereby ensuring the rapid conclusion of judicial review of the validity of the standards.

II. 1. *The Particulate Test Method.* Particulate emission limits were proposed for steam generators, incinerators, and cement plants, based on measurements made with the full EPA sampling train, which includes a dry filter as well as impingers, which contain water and act as condensers and scrubbers. In the impingers the gases are cooled to about 70° F. before metering.

There were objections to the use of impingers in the EPA sampling train, with suggestions that the particulate standards be based either on the "front half" (probe and filter) of the EPA sampling train or on the American Society of Mechanical Engineers test procedure. Both of these methods measure only those materials that are solids or liquids at 250° F. and greater temperatures.

It is the opinion of EPA engineers that particulate standards based either on the front half or the full EPA sampling train will require the same degree of control if appropriate limits are applied. Analyses by EPA show that the material collected in the impingers of the sampling train is usually although not in every case a consistent fraction of the total particulate loading. Nevertheless, there is some question that all of the material collected in the impingers would truly form particulates in the atmosphere under normal dispersion conditions. For instance, gaseous sulfur dioxide may be oxidized to a particulate form—sulfur trioxide and sulfuric acid—in the sampling train. Much of the material found in the impingers is sulfuric acid and sulfates. There has been only limited sampling with the full EPA train such that the occasional anomalies cannot be explained fully at this time. In any case, the front half of the EPA train is considered a more acceptable means of measuring filterable particulates than the ASME method in that a more efficient filter is required and the filter has far less mass than the principal ASME filter in relation to the sample collected. The latter position was reinforced by a recommendation of the Air Pollution Control Association.

Accordingly, we determined that, for the three affected

source categories, steam generators, incinerators, and cement plants, particulate standards should be based on the front half of the EPA sampling train with mass emission limits adjusted as follows:

	Originally proposed particulate standards, full EPA train	Recommended particulate standards revised sample method (front half only)
Steam Generators—		
pounds per million Btu heat input	0.20	0.10
Incinerators—grains per standard cubic foot at 12 percent CO_2	0.10	0.08
Cement Kilns—		
pounds per ton feed	0.30	0.30
Cement Coolers—		
pounds per toon feed	0.10	0.10

The adjusted standards are based on EPA sampling results and are designed to provide the same degree of control as the originally proposed standards. In the case of steam generators, the installations which were found to be best controlled showed reasonably large concentrations (about 50 percent) of materials in the impingers. The five incinerator [5768] tests which showed compliance with the originally proposed standard all indicated impinger catches of 20 to 30 percent. All five of these tests indicate compliance with the original and the revised standard.

In the case of cement plants, holding to the same allowable emission rate while changing the sampling method results in a slight relaxation of the standard. This permits an electrostatic precipitator as well as a fabric filter to meet the emission standard.

2. *The Sulfur Dioxide Standard for Steam Generators of 1.2 Pounds Per Million B.T.U. Heat Input.* The Administrator took into account the following facts in determining that there has been adequate demonstration of the achievability of the standard.

There are at present three SO_2 removal systems in operation at U.S. power stations. Moreover, a total of 13 electric power companies have contracted for the construction of seventeen additional units, most of which will become operational in the next 2 years. Most of these employ lime or limestone scrubbing, but magnesium oxide and sodium hydroxide scrubbing and catalytic oxidation also will be used. In addition, seven units will be equipped with water scrubbers for fly ash collection in the anticipation that they may be converted to SO_2 removal in the future. Eight different firms are designing the installations. One of the installations, a sodium hydroxide scrubber, is guaranteed by the designer to achieve 90 percent or better SO_2 removal. Four others are guaranteed at 80 percent or better. Table I summarizes information about these installations. Generally, the standard of 1.2 pounds of sulfur dioxide per million B.t.u. input can be met by the removal of 70-75 percent of the sulfur dioxide formed in the burning of coal of average sulfur content (i.e., 2.8-3 percent).

A 125-megawatt unit now operated by the Kansas Power and Light Co. at Lawrence, Kans., was put into operation in December 1968. Several problems were experienced originally and appreciable revisions have been made to improve the system. The most successful operation of the scrubber has occurred during 1971.

In some respects the plant is atypical in that it is not required to burn coal continually. Natural gas is available much of the time, and the station also has a supply of fuel oil that can be burned in emergencies when natural gas is not available. Kansas Power and Light has used this flexibility to advantage in the operation of the scrubber. It frequently switches the unit from coal to natural gas, bypassing the scrubber, so that they can inspect the internals for possible malfunction. The generating unit was seldom operated longer than 4 weeks on coal firing without making such inspections. In most instances, little or no maintenance was required during the outage, and the company then merely inspected the scrubber.

Power station	Unit Size	Designer SO_2 system	New or retrofit	Scheduled startup	Anticipated efficiency of SO_2 removal
Limestone Scrubbing:					
1. Union Electric Co., Meramec No. 2.	140	Combustion Engineer	R	September 1968	Operated at 73% efficiency during EPA test.
2. Kansas Power & Light, Lawrence Station No. 4.	125	Combustion Engineer	R	December 1968	Do.
3. Kansas Power & Light, Lawrence Station No. 5.	430	Combustion Engineer	N	December 1971	Will start at 65% and be upgraded to 83%.
4. Kansas City Power & Light, Hawthorne Station No. 3.	100	Combustion Engineer	R	Late 1972	Guaranteed 70%.
5. Kansas City Power & Light, Hawthorne Station No. 4.	100	Combustion Engineer	R	Late 1972	Do.
6. Kansas City Power & Light, Lacygne Station.	800	Babcock & Wilcox	N	Late 1972	80% as target.
7. Detroit Edison Co., St. Clair Station No. 3.	180	Peabody	R	Late 1972	90% as target.
8. Detroit Edison Co., River Rouge Station No. 1.	265	Peabody	R	Late 1972	Do.
9. Commonwealth Edison Co., Will County Station No. 1.	175	Babcock & Wilcox	R	February 1972	Guaranteed 80%.
10. Northern States Power Co., Sherburne County Station, Minn., No. 1.	700	Combustion Engineer	N	1976	

11. Arizona Public Service, Cholla Station Co.	115	Research Cottrell	R	December 1973	
12. Tennessee Valley Authority, Widow's Creek Station No. 8.	550	Undecided	R	1974-75	
13. Duquesne Light Co., Philips Station.	100	Chemico	R	March 1973	Do.
14. Louisville Gas & Electric Co., Paddy's Run Station.	70	Combustion Engineer	R	Mid-late 1972	Do.
15. City of Key West, Stock Island.[1]	37	Zurn	N	Early 1972	Guaranted 85% removal.
16. Union Electric Co., Meramec No. 1	125	Combustion Engineer	R	Spring 1973	80% as target.
Sodium Hydroxide Scrubbing Installations:					
1. Nevada Power Co., Reed Gardner Station.	250	Combustion Equipment Associates.	R	1973	Guaranteed 90% SO_2 while burning 1% S coal.
Magnesium Oxide Scrubbing Installations:					
1. Boston Edison Co., Mystic Station No. 6.[2]	150	Chemico	R	February 1972	90% target.
2. Potomac Electric Power, Dickerson No. 3.	195	.... do.	R	Early 1974	90%.
Catalytic Oxidation:					
1. Illinois Power, Wood River.[2]	100	Monsanto	R	June 1972	Guaranteed 80% SO_2 removal.

[1] Oil fired plants (remainder are coal-fired).

[2] Partial EPA funding.

All water from the pond is recycled back to the scrubber. Blowdown from cooling towers constitutes makeup water. The sludge oxidizes to sulfate in the pond. Eventually, sulfate may be removed from the system and taken with the ash to landfills.

The limestone system for the new 430-megawatt steam-electric unit at the Lawrence station is essentially the same as the smaller unit. It has been operated only on a limited basis to date. The company plans to operate at 65 percent SO_2 removal, then upgrade to 80 percent or more based on experience with the 125-megawatt unit. With the new system sulfate crystallization will be accomplished in tanks. The company plans to run clarified liquor from the crystallizers directly back to the scrubbers. A solids content of 6-10 percent will be maintained in the recycle liquor to prevent scaling in exposed surfaces.

Combustion engineering pilot studies. Pilot studies conducted by the Combustion Engineering Co. on a 1 mw. equivalent stream showed 95 percent SO_2 removal with continuous crystallization and 100 percent water recycle from crystallizers. The studies form the basis upon which CE is guaranteeing that its new installations will remove at least 70 percent of SO_2.[4]

Battersea scrubber. The principle of alkaline scrubbing has been demonstrated at the Battersea Power Station in England, where a scrubber has been in use since 1932. A multiple stage process is employed. Alkaline river water is used in the first stage and lime-neutralized liquor in subsequent stages. The steam generator is of 3,500 million B.t.u. rating. Reports indicate that the efficiency of this system exceeds 90 percent when the boiler is fired with 0.8 to 1 percent sulfur coal. Similar systems are in operation on two 150-mw. oil-fired boilers at the Bankside Power Station in England.

Swansea scrubber. Lime scrubbing processes were installed on coal-fired units at the Swansea Power Station

and the Fulham Power Station in England prior to World War II. The system at the Fulham Station reportedly operated successfully until shut down for security reasons early during World War II. It was not reactivated after the war. The Swansea installation was operated for about 2 years on a coal-fired power boiler [5769] and is not now in service. Unlike the Battersea and Bankside operations, these units utilized a continuous liquid recycle. The systems were reported to operate at SO_2 efficiencies of 90 percent or greater.

Bahco lime scrubbing. The two-stage system has been demonstrated at about 98 percent SO_2 removal over a 6-month period on a 7-mw. oil-fired steam generator in Sweden. The process is now being offered under license in the United States by Research Cottrell. None of the Bahco systems have yet been installed on coal-fired boilers. Nevertheless, the two-stage scheme appears to offer definite advantages over single-stage processes in achieving high removal efficiencies.

Wellman power gas sulfite scrubbing. The sulfite-bisulfite system has been installed on two oil-fired boilers in Japan. The combined capacity is about 650 million B.t.u. per hour. Since it was put into operation in June 1971; removal efficiencies of 95 percent have been reported with exit levels of about 0.2 pounds SO_2 per million B.t.u. The system has not been operated on a coal-fired boiler. However, since precipitators have been shown to remove particulates down to the same level as oil-fired units, application of the sulfite system to coal-fired boilers should be feasible.

A principal difficulty in operating lime based scrubbing systems has been the tendency to form scale on scrubber surfaces. Union Electric, TVA, and to a lesser extent Kansas Power and Light have reported scaling problems. The experience of Kansas Power and Light and European and Japanese installations show that scaling can be held to a tolerable level. Present designs probably will be revised to

optimize cost versus scaling. The use of two or more stages would appear desirable for high sulfur coals.

In all probability, there will be some scale formation in all closed circuit lime scrubbing systems for SO_2 abatement. At the Bahco installation as at the Kansas Power and Light installation in the United States, this is minimized by keeping the solution pH in the acid region. In addition to this, a Mitsubishi Heavy Industries pilot plant in Japan has employed seed crystals and a delay tank and was reportedly able to operate for 500 hours without any sign of scaling (i.e., the scaling took place on the seed crystals).

In addition to operating at an acid pH, the Bahco system employs a wide open scrubber that can tolerate appreciable scale deposits. It was reported that the installation of additional spray heads to more thoroughly wash the wetted surfaces at the Bischaff installation in West Germany helped to prevent scale formations.

All three installations cited above have reported successful periods of operation while employing the above-mentioned techniques. The most successful of these is the Bahco unit which has had no serious operational difficulties since November 1969. These examples show that lime systems can be operated without unscheduled shutdown due to scale problems.

3. *Cost of compliance with steam generator standards.* The economic impact of the new source performance standards and requisite pollution control expenditures have been developed for a typical new coal-fired unit of 600-megawatt (MW) capacity. The investment cost for such a plant would be $120 million plus $18 million for sulfur dioxide and particulate control and $1 million for nitrogen oxide control. The $19 million total can be compared to $3.6 million which would have been expended for particulate control if sulfur dioxide and nitrogen oxide abatement were not required.

On an annualized basis the pollution control costs would be 0.13 cents per kw.-hr. for sulfur dioxide and particulate control plus 0.01 cents per kw.-hr. for nitrogen oxide control. Particulate control alone would cost 0.01 cents per kw.-hr. An average revenue of 1.56 cents per kw.-hr. is assumed. Based on these figures, the cost of pollution control will be about 9 percent of the delivered cost of electricity if all plants operated by the utility in question had to incur a comparable cost. Using a figure of $130 per year as the average residential electric bill, the increased cost of electricity to a residential customer would be about $1 per month if the total cost of control is passed on to the customer.

An indication of the impact of increased electricity cost on industrial consumers may be obtained by examining the relationship of electricity cost to production costs. An upper limit may be approximated by considering the aluminum industry, a large consumer of electrical energy. If the aluminum industry were to incur an increase of nine percent in electricity cost, production costs would increase by about 1.4 percent. Although aluminum smelters usually consume hydroelectric power and would not realize pollution control costs increases, nonetheless, the figures show that even for a large consumer the impact of increased electricity cost is fairly small. In general, the estimated electricity cost increase will have only a minor impact on production costs.

Each year the power industry puts into operation about 49 new steam-electric units. On the average, 29 are fired with coal, seven with oil, and 13 with natural gas. Most of the oil-fired units and a few of the coal-fired units may burn low sulfur fuel. The number requiring flue gas desulfurization is estimated to be between 20 and 30 per year. Most of these, 15 to 20, will be located east of the Mississippi River.

The foregoing cost projections are based on estimated costs of $30 per installed kilowatt for sulfur dioxide scrubbing systems which will also be capable of controlling coal particulate to the level of the standard. Some power dis-

tributors have questioned the figure and suggest that the actual cost may be close to $70 per kw. Nevertheless, a review of applicable cost estimates for calcium base SO_2 scrubbing system shows support for the EPA estimate.

The four estimates listed in table II for new plants range from $18.7 to $25.67 per kw. Three of the plants are large—680 to 1,000 mw. All five estimates for retrofitting existing plants show greater cost, ranging from $28.6 to $61.8 per kw. The retrofit estimates tend to cover smaller steam generators, only one of the five being greater than 180 mw. In addition, the retrofit costs tend to reflect unusual circumstances which would not be expected at new plants. All are closed circuit limestone or calcium hydroxide systems except for the small unit at Key West, Fla. In the closed circuit system, all waters are recycled to avoid problems of liquid and solid waste disposal.

TABLE II

COST ESTIMATES FOR EQUIPPING COAL FIRED STEAM-ELECTRIC PLANTS WITH CALCIUM BASE SCRUBBING SYSTEMS (1971 ESTIMATES)

Source of estimate	Size	Capital cost
Zurn Industries	37 MW (New).	$20.4/kw.
(Key West installation).		
Northern States Power Co.	2-680 MW (New).	$18.7/kw.
Babcock & Wilcox	800 MW (New).	$25.67/kw.
(Hypothetical plant in midwest).		$19.20/kw.
Tennessee Valley Authority	1000 MW (New).	$54.5 to
Do	550 MW (Retrofit).	$61.8/kw.
Louisville Gas & Electric Co.	70 MW (Retrofit).	$28.6/kw.
Duquesne Light Co.	100 MW (Retrofit).	$35/kw.
Commonwealth Edison Co.	175 MW (Retrofit).	$49/kw.
Detroit Edison Co.	4-180 MW (Retrofit).	$49.6/kw.

Projected capital costs for nitrogen control will range from nil to $3.50 per kw. The greatest cost will be incurred from those units which will use combinations of flue gas recirculation and off-stoichiometric combustion to achieve the standard. Many of these will be gas-fired boilers which

will not have to expend any capital for sufulr dioxide or particulate control. The least cost will be for corner-fired coal burning boilers which should be able to meet the standards without any modification. Corner-fired units are sold by only one of the four major U.S. power boiler manufacturers. The other three firms have experience with nitrogen oxide reduction schemes for gas and oil burning but it is uncertain what methods they will employ with coal burning. Consequently, precise costs are uncertain, but it is expected that the nitrogen oxide standard will stimulate interest in combustion techniques which can achieve the required emission levels at little or no increase in cost.

4. *The nitrogen oxide standard for coal-fired steam generators.* The standards set an emission limit of 0.7 pound of nitrogen oxide per million B.t.u. coal-fired steam generators. This is roughly equivalent to a stack gas concentration of 550 parts per million for a bituminous-fired operation. Several electric utilities and three of the four major boiler manufacturers commented that the technology was not fully demonstrated to achieve the standard.

[5770] The coal standard is based principally on nitrogen oxide levels achieved with corner-fired boilers which are manufactured by only one company—Combustion Engineering. This firm has confirmed in writing that it will guarantee to meet the nitrogen oxide standard. Investigations by an EPA contractor showed that other types of boilers could meet the standard under modified burning conditions. In fact, two of the three remaining companies have informed EPA they will guarantee that their new installations will meet the EPA standard of 0.7 pound/million B.t.u. on new installations.

5. *Particulate standards for kilns in portland cement plants.* Particulate emission limits of 0.3 pound per ton of feed to the kiln were proposed for cement kilns. This is roughly equivalent to a stack gas concentration of 0.03 grains per standard cubic foot.

The Portland Cement Association, American Mining Congress, a local control agency and the major cement producers commented that the kiln standard was either too strict or it is not based on adequately demonstrated technology, i.e. fabric filters can not be used for all types of cement plants. On the other hand, a comment was received from an equipment manufacturer stating that equipment other than fabric filters also can be used to meet the standard and citing supportive data for electrostatic precipitators. In addition, the AMC, a local agency and cement producers commented that the particulate standards for cement kilns are stricter than those promulgated for power plants and municipal incinerators. Further they objected to the test method to be used to determine compliance.

The proposed standard was based principally on particulate levels achieved at a kiln controlled by a fabric filter. Several other kilns controlled by fabric filters had no visible emissions but could not be tested due to the physical layout of the equipment. After proposal, but prior to promulgation a second kiln controlled by a fabric filter was tested and found to have particulate emissions in excess of the proposed standard. However, based on the revised particulate test method, the second installation showed particulate emissions to be less than 0.3 pound per ton of kiln feed.

The promulgated standard is roughly equivalent to a stack gas concentration of 0.03 grains per standard cubic foot. The power plant standard is equivalent to 0.06 grains per standard cubic foot at normal excess air rates. The incinerators standard is 0.08 grains per standard cubic foot corrected to 12 percent carbon dioxide. Uncorrected, at normal conditions of 7.5 percent carbon dioxide it is equivalent to 0.05 grains per standard cubic foot. The difference between the particulate standard for cement plants and those for steam generators and incinerators is attributable to the superior technology available therefor (that is, fabric filter

technology has not been applied to coal-fired steam generators or incinerators).

In sum, considering the revision of the particulate test method, there are sufficient data to indicate that cement plants equipped with fabric filters and precipitators can meet the standard.

6. *Cost of achieving particulate standard for kilns at portland cement plants.* A limit of 0.3 pounds per ton of feed to the kiln was proposed. The limit applies to all new wet or dry process cement kilns.

Three cement producers commented that a well-controlled plant would cost much more than indicated by EPA. A meeting between American Mining Congress and EPA revealed that that association felt the cost of an uncontrolled cement plant as reported by EPA was low by a factor of 1.5 to 2. However, the association agreed that EPA had accurately estimated the cost of the pollution control equipment itself. Accordingly, no change in the standard was warranted on account of cost. Indeed, if the industry is correct in asserting that the cost of an uncontrolled plant is higher than that estimated by EPA, that means that the cost of pollution control expressed as a percentage of total cost is less than the 12 percent figure cited in the background document, APTD-0711, which was distributed by EPA at the time the standards were proposed.

7. *Sulfur dioxide and acid mist standards for sulfuric acid plants.* Sulfur dioxide emission limits of 4 pounds per ton of acid produced and acid mist emission limits of 0.15 pounds per ton of acid produced were proposed for sulfuric acid plants.

Several sulfuric acid manufacturers and the Manufacturing Chemists Association commented that the proposed SO_2 standard is unattainable in day-to-day operation at one of the plants tested or that it is unduly restrictive. They

asserted that to meet the standard, the plant would have to be "designed to 2 pounds per ton" to allow for the inevitable gradual loss of conversion efficiency during a period of operation, and that units capable of such performance have not been demonstrated in this country. Essentially, the same parties commented that there is published data showing that due to the vapor pressure of sulfuric acid, the acid mist standard is not attainable.

The proposed standard was based principally on sulfur dioxide levels achieved with dual absorption acid plants and one single absorption plant controlling emissions with a sodium sulfite SO_2 recovery system. There are only three dual absorption plants in this country. Company emission data at one of the plants tested indicates the plant was meeting the proposed standard for a year of operation when the production rate was less than 600 tons per day. The plant is rated at 700 tons per day. At the second U.S. plant, emissions were about 2 pounds per ton about two months after startup. Discussion with foreign dual absorption plant designers and operators indicates normal operation at 99.8 percent conversion or higher for 99 percent of the time over a period of years. This conversion efficiency is equivalent to approximately 2.5 pounds per ton of acid produced.

Complaints from the industry that it cannot meet the acid mist standard appear to be based on experience with other test methods than EPA's. Such other methods measure more sulfur trioxide and acid vapor, in addition to acid mist, than does the EPA method. Tests of several plants with the EPA test method have shown acid mist emissions well below the emission limits as set in the standards.

8. *Cost of achieving sulfur dioxide standard at sulfuric acid plants.* A limit of 4 pounds of sulfur dioxide per ton of acid produced is set by the regulation. The limit applies to all types of new contact acid plants except those operated for control purposes, as at smelters.

The sulfuric acid industry has commented that (1) the cost of achieving the proposed sulfur dioxide standard is about three times the EPA estimate, and (2) promulgation of a standard 60 percent less restrictive than proposed by EPA would reduce the control cost 47 percent.

In developing the parallel cost estimates, both the industry and EPA assume the dual absorption process will be used to control sulfur burning plants and many spent acid plants. The more costly Wellman-Power Gas sulfite scrubbing system will be used with plants which process the most contaminated spent acid feedstocks where capital investment historically is 80 percent greater than sulfur burning plants. The Wellman-Power Gas process would also be used for retrofitting existing plants where appropriate. Both the dual absorption and Wellman-Power Gas processes have been demonstrated on commercial installations. Seventy-six dual absorption plants have been constructed or designed since the first in 1964. Only three, however, are located in this country. One sulfite scrubbing process is now in operation in the United States and four more will be put into service in 1972. All are retrofit installations. Two other such scrubbers are being operated in Japan. These seven installations consist of three acid plants, two claus sulfur recovery plants, an oil-fired boiler, and a kraft pulp mill boiler.

Control costs. EPA engineers have reviewed the industry analysis and find no reason to change their original cost estimate. As summarized in Table III, EPA estimates that the cost of achieving the standard is $1.07 to $1.32 per ton of acid for dual absorption systems and $3.50 per ton for sulfite scrubbing systems. The industry estimate for a sulfur burning dual absorption plant is $2.31 greater than EPA's. We believe the industry's estimate to be excessive for the following reasons. **[5771]**

TABLE III

ESTIMATED COSTS OF CONTROLLING SULFUR DIOXIDE FROM CONTACT SULFURIC ACID PLANTS

	Dual absorption process		Sodium sulfite scrubbing	
	Industry	EPA	Industry	EPA
Sulfur burning plants:				
Direct Investment (Thousands of $)	2,000	550	Not anticipated for new sulfur burning plants.	
Total Added Cost ($/Ton)*	3.33	1.07		
Spent acid plants:				
Direct Investment (Thousands of $)	3,100	900	2,200	2,300
Total Added Cost ($/Ton)*	4.45	1.32	4.11	3.50

* Total added cost includes depreciation, taxes, 16% return on investment after taxes and other allocated costs.

Seventy-two percent of the difference between the Du Pont and EPA estimates is due to direct investment, plant overhead, and operating costs for auxiliary process and storage equipment which Du Pont predicts will be necessary to satisfy the standards. EPA does not believe that such auxiliary equipment will be necessary in practice to meet the standard.

Twenty percent of the difference is due to differences in estimates of the cost and consumption of utilities. Elimination of auxiliary equipment referred to above reduces the consumption rate of both electricity and steam. Eight percent results from the industry's apportionment of "other allocated costs" (Corporate Administration, i.e., sales, research, and development, main office, etc.) in proportion to their estimate of the additional investment required for control. Although an accepted procedure for internal cost accounting, this does not represent a true out-of-pocket cost.

In sum, the EPA analysis shows that meeting the proposed standard with a dual absorption plant requires a substantial investment over an uncontrolled plant but only

30 percent as great as indicated by the industry. Moreover, relaxation of the proposed standard by 60 percent (to the level recommended by the industry) would decrease the cost of control in dual absorption plants only 10 to 15 percent. For sulfur burning plants the cost differential would be $0.10 per ton of acid. For spent acid plants, it would be $0.17.

Economic impact of proposed standard. Most sulfuric acid production is captive to large vertically integrated chemical, petroleum, or fertilizer manufacturers. An increasing volume of production also results from the recovery of sulfur dioxide from stack gases or the regeneration of spent acid instead of its discharge into streams.

Depending on the abatement process selected and the plant size, the direct investment for control can range from 14 to 38 percent of the investment in an uncontrolled acid plant.

The added cost of air pollution control, coupled with the inherent market disadvantage of the small manufacturer, may make future construction of plants of less than 500 tons per day economically unattractive except as a sulfur recovery system for another manufacturing process.

It is estimated that the average market price will increase by $1.07 per ton reflecting the lower end of the cost range. This represents a small increase in the $31 per ton market price and will have little effect on the demand for acid.

The increasing production of recovered and regenerated acid, as a result of abatement efforts, will inhibit the growth of conventional acid production and threaten eventually to displace much of that production.

WILLIAM D. RUCKELSHAUS,
Administrator.

MARCH 16, 1972.

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